

BOOKLET



Forum Ilmiah Diaspora Indonesia

Organized By:

**IKATAN ILMUWAN
INDONESIA
INTERNASIONAL**



BRIN
BADAN RISET
DAN INOVASI NASIONAL



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Pendahuluan

Pada tahun 2045, bangsa Indonesia akan memasuki usia kemerdekaannya yang ke-100. Pada saat itu Indonesia diproyeksikan akan menjadi bangsa yang maju dan kuat atau dikenal dengan istilah Indonesia Emas, salah satu faktor utamanya adalah penduduk Indonesia saat itu akan mengalami bonus demografi dimana jumlah penduduk Indonesia sangat produktif, yaitu angkatan kerja (usia 15-64 tahun) lebih besar dibandingkan penduduk yang tidak produktif (di bawah 5 tahun dan di atas 64 tahun). Oleh karena itu, dibutuhkan sumber daya manusia (SDM) yang berkualitas dalam rangka menyongsong era tersebut.

Bangsa Indonesia diharapkan akan menjadi bangsa yang maju dalam berbagai bidang, baik sains dan teknologi maupun ekonomi, serta mampu mengatasi berbagai permasalahan, baik kemiskinan maupun ketertinggalan dalam bidang pendidikan. Namun demikian, untuk mencapai itu semua perlu diperhatikan berbagai tantangan sekaligus peluang, sebagai dampak perubahan-perubahan di berbagai sektor kehidupan, baik secara nasional maupun global.

Peluang yang bisa kita lakukan untuk mencapai cita-cita Indonesia Emas pada 2045 yaitu kolaborasi multi stakeholder termasuk industri dan pendidikan untuk mempercepat dan mengkonsolidasikan perubahan berkelanjutan baik dalam pola konsumsi maupun produksi. Kolaborasi pendidikan dan industri sangat penting diperkuat dalam mewujudkan visi Indonesia Emas. Visi tersebut mesti tercapai pada 2045 untuk menyongsong 100 tahun Indonesia merdeka.

Ikatan Ilmuwan Indonesia Internasional (I-4) sebagai organisasi nirlaba dengan lebih dari 3,000 anggota yang terdiri dari ilmuwan Indonesia dari seluruh dunia (~1,000 anggota diaspora). Keanggotaannya terdiri dari beberapa jenjang: Anggota Muda (Pendidikan Terakhir: S1), Anggota Madya (S2) dan Anggota Prima (S3). ~40% dari anggota adalah Anggota Madya dan ~33% adalah Anggota Prima. Salah satu misi penting I-4 adalah pengembangan kolaborasi (antara ilmuwan diaspora dan ilmuwan di Indonesia) dan capacity building (antara mid-/senior- dan early-career researchers).

Acara daring yang diselenggarakan terutama di beberapa tahun terakhir selama pandemic, telah berhasil meningkatkan jangkauan I-4, tetapi membangun jaringan (networking), menjajaki kolaborasi dan sinergi dapat dimaksimalkan melalui kegiatan yang diselenggarakan secara luring.

Melalui kegiatan Forum Ilmiah Diaspora Indonesia (FIDI) atau Indonesian Diaspora Scientific Forum (IDSF) yang diinisiasi oleh I-4 bekerjasama dengan Badan Riset dan Inovasi Nasional (BRIN), diharapkan menjadi diskusi interaktif dan kolaboratif antara narasumber ahli dalam bidangnya dengan para peneliti Indonesia baik dari dalam dan luar negeri, terutama mengenai cara membangun kolaborasi untuk Riset yang Inovatif dan Produktif yang diperuntukkan bagi peneliti, staf pengajar, dan pelajar Indonesia, serta diharapkan bisa menghasilkan luaran yang konkret untuk kemajuan riset dan publikasi ilmiah.

SUSUNAN ACARA



Forum Ilmiah Diaspora Indonesia

24 Agustus 2023

Time start	Time end	Session
8:00	9:00	Registration
9:00	9:10	Opening by Chair of FIDI 2023
9:10	9:20	Opening by Prof Edy Giri, Deputi Bidang Sumber Daya Manusia Ilmu Pengetahuan dan Teknologi BRIN
9:20	10:00	Keynote talk 1 (Prof. Delvac Oceandy - University of Manchester, UK) - Advances in Cardiovascular Regenerative Medicine: A Basic Science Perspective
10:00	10:40	Keynote talk 2 (Dr. Ahmad Ridwan Tresna Nugraha - Pusat Riset Fisika Kuantum, BRIN) - Quantum Science and Technology Initiative in Indonesia
10:40	10:55	Break
10:55	11:35	Keynote talk 3 (Dr. Sastia Prama Putri - Osaka University, Japan) - Metabolomics-driven approach for quality improvement of high value Indonesian food products
11:35	12:00	Plenary presentation by Chairman of BRIN (Dr. L. T. Handoko)
12:00	13:30	Lunch
13:30	14:10	Keynote talk 4 (Dr. Alpraditia Malik - Ritsumeikan University, Japan) - Public housing and cross-class interaction toward more sustainable housing and community for Indonesia 2045: What can we learn from the developed countries?
14:10	14:30	Break
14:30	14:45	Presentation by Kedeputian Sumber Daya Manusia Ilmu Pengetahuan dan Teknologi BRIN (Dr. Raden Arthur Ario Lelono)
14:45	15:00	Presentation by Kedeputian Fasilitasi Riset dan Inovasi BRIN (Dr. Ajeng Arumsari)
15:00	15:15	Presentation by Kedeputian Infrastruktur Riset dan Inovasi BRIN (Dr. Yan Rianto)
15:15	15:45	Discussion
15:45	16:30	Networking session



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Forum Ilmiah Diaspora Indonesia

25 Agustus 2023

Session 1.1

Session chairs: Mahardhika Pratama & Dwi Susanto

Time start	Time end	Abstract #	Name	Institution	Title
8:30	8:50	ID-002	Andrivo Rusydi	National University of Singapore, Singapore & Center For Free Electron Laser (CFEL), Hamburg	tba
8:50	9:10	IB-008	Edi Suprayoga	BRIN - Indonesia	Comparative Study of Thermoelectric Properties of MoX ₂ (X =S, Se, Te) using First Principle Calculation
9:10	9:30	IB-004	Julio	Badan Riset dan Inovasi Nasional, KST Habibie, Tangerang Selatan 15314, Indonesia	Probing new physics via flavor-violating processes
9:30	9:45	O-011	Rudini Mulya	Universitas Trisakti	Ratiometric optical oxygen sensor based on perovskite quantum dots and Rh110 embedded in an ethyl cellulose matrix.
9:45	10:05	Break			
10:05	10:25	IB-001	Andhika Prima Prasetyo	Pusat Riset Konservasi SD Laut dan Perairan Darat, BRIN - Indonesia	Shark-dust: Application of high-throughput DNA sequencing of processing residues for trade monitoring of threatened sharks and rays
10:25	10:45	ID-032	Muhammad Wahyudin Lewaru	Departemen Ilmu Kelautan, Universitas Padjadjaran	Diversity of bacterial in Muara Gembong Estuary, Citarum River, West Java, Indonesia
10:45	11:05	ID-029	Rahmita Sari Rafdinal	P.S. Mitsubishi Construction + Japan	COLLABORATION WORK BETWEEN JAPAN AND INDONESIA ON THE DEVELOPMENT OF NEW TECHNOLOGY FOR CORROSION PROTECTION AND REMOTE MONITORING FOR BRIDGE STRUCTURE
11:05	11:25	ID-025	Indarta Kuncoro Aji	PT Kakiatna Enjiniring + Indonesia & Molten Salt Lab. Inc. + Jepang	Pengembangan Teknologi Molten Salt Indonesia – Jepang



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25 Agustus 2023

Session 1.2

Session chairs: Edi Suprayoga & Indarta Kuncoro Aji

Time start	Time end	Abstract #	Name	Institution	Title
13:30	13:50	ID-005	Mahardhika Pratama	University of South Australia	Handling Dynamic Worlds with Continual and Autonomous Machine Learning
13:50	14:10	ID-011	Muhammad Syafrudin	Sejong University, Republic of Korea	Applications of Industrial Internet of Things
14:10	14:30	ID-018	Agustian Taufiq Asyhari	Monash University, Indonesia, and Birmingham City University, UK	AI and Digital Technology's Roles in Climate Change Mitigation: Lessons Learnt from the World's Pioneering 5G Connected Forest and Beyond
14:30	14:50	ID-024	Hermawan Nugroho	University of Nottingham Malaysia	Embedded System for Plant Disease Detection
14:50	15:05	O-002	Indra Chandra	Universitas Telkom, Indonesia	Membangun Kemandirian Bangsa dengan Sistem Pemantauan Lingkungan yang Terintegrasi
15:05	15:25	Break			
15:25	15:40	O-021	Wirawan Ciptonugroho	Universitas Sebelas Maret (Indonesia)	Mono and bifunctional heterogeneous catalyst for biobased chemical transformation
15:40	16:00	ID-019	Wahyu Satpriyo Putro	AIST, Japan	Time has Come to Industrialize Transformation of Bio-based SiO ₂ into Si-based Chemicals
16:00	16:20	IB-005	Mujiyanto	Badan Riset dan Inovasi Nasional, Indonesia	Association of benthic life species on the surface Lobster Artificial Reef in Prigi Bay East Java
16:20	16:40	IB-006	Ali Rahmat	Badan Riset dan Inovasi Nasional, Indonesia	Characteristics of Durian seeds Biochar at Different Pyrolysis Temperatures



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25 Agustus 2023

Session 2.1

Session chairs: Andi Saptono & Astri Nur Faizah

Time start	Time end	Abstract #	Name	Institution	Title
8:30	8:50	ID-031	Jerome Irianto	Florida State University, USA	Genomic heterogeneity in pancreatic cancer organoids and its stability with culture
8:50	9:10	ID-035	Susanti Susanti	Research Scientist, Cancer Research UK Beatson Institute, Glasgow UK Lecturer, Faculty of Pharmacy, Universitas Muhammadiyah Purwokerto, Indonesia	Investigating the early onset colorectal cancer
9:10	9:25	O-027	Jessica Rusli	ITB, ISTA Indonesia	Hepatocyte Targeted Aptamer Nanoparticle Modification For Delivery of Angiotensinogen siRNA In vitro
9:25	9:40	O-018	Siti Aisyah	Universitas Bangka Belitung + Indonesia	MORPHOMETRY-MOLECULAR STUDIES AND BLOOD CHARACTERISTICS OF HORSESHOE CRAB FOR THE SPECIES SUSTAINABILITY IN TANJUNG PUNAI WEST BANGKA
9:40	10:20	Break			
10:20	10:40	IB-012	Sri Jayanti	Pusat Riset Biologi Molekuler Eijkman, Organisasi Riset Kesehatan, Badan Riset dan Inovasi Nasional, Indonesia	Wajah Janus bilirubin: dari toksisitas neonatal hingga potensi perlindungan pada penyakit neurodegeneratif
10:40	11:00	ID-003	Astri Nur Faizah	National Institute of Infectious Diseases	Non-Pathogenic Microbiome as Potential Biocontrol Agents for Vector-Borne Viral Diseases
11:00	11:15	O-013	Evita Yuliatul Wahidah	STAI Al Musaddadiyah Garut	SPIRITUALITY AND MEDICAL RESILIENCE: A CASE STUDY OF CHRONIC DISEASES IN ADOLESCENT AND ELDERLY IN INDONESIA
11:15	11:30	O-026	Devi Mekar Sari	AKADEMI KEPERWATAN YPTK SOLOK, INDONESIA	RELATIONSHIP PSYCHOSOCIAL CONDITION PATIENTS SCHIZOPHRENIA WITH PERCEIVED STIGMA BY PATIENTS SCIZOPHRENIA HOSPITAL WEST SUMATRA BARAT



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25 Agustus 2023

Session 2.2

Session chairs: Andriwo Rusydi & Rahmita Sari Rafdinal

Time start	Time end	Abstract #	Name	Institution	Title
13:30	13:50	ID-012	R. Dwi Susanto	University of Maryland, College Park, USA	Saatnya Kita Memanen Listrik Dari Laut
13:50	14:10	ID-015	Marolop Dapot Krisman Simanullang	Air Liquide, Research and Development, Innovation Campus Tokyo, Japan	Peranan R&D industri dalam pengembangan energi berbasis hidrogen melalui kolaborasi dengan akademika dan pemerintah
14:10	14:30	ID-016	Irwan Lipto Simanullang	Kyushu University, Jepang	Pengembangan Reaktor Nuklir Generasi IV Skala Kecil berbasis High-Temperature Gas-Cooled Reactor (HTGR)
14:30	14:50	IB-007	Angga Hermawan	BRIN, Indonesia	High energy density asymmetric supercapacitors enabled by La-induced defective MnO ₂ and biomass-derived activated carbon
14:50	15:05	O-017	Boni Sena	Universitas Singaperbangsa Karawang + Indonesia	Enhancing Energy Efficiency in Freezers Using Dry Ice Gel-Based Phase Change Materials: A Step towards Sustainable Household Electricity Consumption
15:05	15:25	Break			
15:25	15:45	ID-034	Muhammad Aziz	The University of Tokyo	Carbon-Free Energy Systems Toward the Realization of Zero Carbon Society in Indonesia
15:45	16:05	ID-036	Fatwa Firdaus Abdi	School of Energy and Environment, City University of Hong Kong, Hong Kong SAR	Photoelectrochemical Green Hydrogen Production
16:05	16:25	ID-001	Shibghatullah Muhammady	The Institute for Solid State Physics, The University of Tokyo	Insights from Defects in Zirconia-Based Cathodes in Fuel Cells for Sustainable Energy Solutions
16:25	16:45	IB-010	Triyono Basuki	BRIN, Indonesia	Formation of iron oxide/iron rich nanoparticle with superior catalytic activity for visible light assisted Fenton reaction induced by organic acid addition in hydrothermal synthesis



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25 Agustus 2023

Session 3.1

Session chairs: Delvac Oceandy & Jekson Robertlee

Time start	Time end	Abstract #	Name	Institution	Title
8:30	8:50	ID-004	Ajeng Kusumaningt yas Pramono	Gifu University, Jepang	Potensi Riset Bakteriofag di Indonesia
8:50	9:10	ID-006	Youdiil Ophinni	Kobe University, Japan	Eradicating HIV/AIDS through gene editing
9:10	9:30	ID-021	Novalia Pishesha	Harvard Medical School/Boston Children's Hospital + USA	Exploiting Antigen Presentation Pathways for Precision Immune Engineering
9:30	9:45	O-004	Muhammad Iqhrammullah	Universitas Muhammadiyah Aceh, Indonesia	Role of lowered level of serum vitamin D on diabetic foot ulcer and its possible pathomechanism: A systematic review, meta-analysis, and meta-regression
9:45	10:15	Break			
10:15	10:35	ID-028	Febrimarsa	University of Galway, Ireland	Randomly incorporated genomic N6-methyldeoxyadenosine delays zygotic transcription initiation in a cnidarian
10:35	10:55	IB-003	Akhirta Atikana	Pusat Riset Mikrobiologi Terapan BRIN	Uncovering the potential of marine actinobacteria from Indonesia as producers of bioactive compounds
10:55	11:15	O-008	Rodhiansyah Djayasinga	Poltekkes Kemenkes Tanjungkarang, Indonesia	Synthesis and Characterization of Ca(OH) ₂ Nanoparticles Made from Purebred Chicken Eggshell Waste as Antibacterial Escherichia coli and Staphylococcus aureus through Photocatalytic Technique: Invitro



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25 Agustus 2023

Session 3.2

Session chairs: Novalia Pishesha & Febrimarsa

Time start	Time end	Abstract #	Name	Institution	Title	
13:30	13:50	ID-009	Muhammad Salman Al Farisi	Hiroshima City University, Japan	Micro-electro Mechanical Systems for Biomedical Mechatronics	
13:50	14:10	ID-013	Andi Saptono	University of Pittsburgh, USA	Peluang AI untuk Kesehatan dan Rehabilitasi Dengan Menggunakan Teknologi Mobile (mHealth)	
14:10	14:30	ID-014	Jekson Robertlee	RIKEN Center for Sustainable Resource Science (CSRS), Japan	Harnessing molecular components to build a synthetic regulatory circuit: a platform for a smart metabolic reprogramming	
14:30	14:50	O-012	Ardiani Putri Rahayu	Universitas Airlangga, Indonesia	Study of the Effect of Residue Content in Catfish on Stunting Cases in Pasuruan, East Java	
14:50	15:20	Break				
15:20	15:40	ID-010	Davin H. E. Setiamarga	National Institute of Technology, Wakayama College, Gobo City, Wakayama, Japan	Natural History Research on Biodiversity using Molecular Biology and Multiomics Approaches	
15:40	16:00	IB-011	Nuruliarizki Shinta Pandupuspitasari	Universitas Diponegoro, Indonesia	Animal, Plant and soil microbiomes: An unexplored source for tackling global warming	
16:00	16:20	O-022	Feerzet Achmad	Institut Teknologi Sumatera, Indonesia	Utilization of Kaffir Lime Extract as A Natural Coagulant and its Effect on The Characteristics of IRR 118 Clone Rubber	
16:20	16:40	O-003	Rusfidra	Universitas Andalas, INDONESIA	EVALUASI KUALITAS SEMEN SEBAGAI DASAR SELEKSI PEJANTAN AYAM KOKOK BALENGGEK	
16:40	17:00	O-015	Evelyne Laura Lasmauli	IPB	Molecular approach for identification of Spodoptera frugiperda Strain in Indonesia using COI (Cytochrome c oxidase Subunit I), and Tpi (Triosephosphate Isomerase)	



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25 Agustus 2023

Session 4.1

Session chairs: Sitti M. Pattahudin & Andante H. Pandyaswargo

Time start	Time end	Abstract #	Name	Institution	Title
8:30	8:50	ID-008	Bambang Trigunaryah	RMIT University, Australia	Research collaboration for better infrastructure project development
8:50	9:10	IB-009	Alin Fithor	Badan Riset dan Inovasi Nasional	Mangunharjo Beach, Semarang : Contribution to Society 5.0
9:10	9:25	O-009	Eli Jamilah Mihardja	Pusat Studi Geopark Universitas Bakrie Jakarta Indonesia	What and How of Geoparks: Mass Media Perspectives in Indonesia
9:25	9:40	O-023	Nurbaiti	Universitas Pertahanan RI, Indonesia	INDONESIA NICKEL MANAGEMENT ON STATE DEFENSE AND ENERGY SECURITY
9:40	10:10	Break			
10:10	10:30	ID-017	Teguh Haryo Sasongko	Institute for Research, Development, and Innovations, International Medical University (Malaysia)	Profile of ASEAN research collaborations with special focus on Indonesia; Scopus analyses 2000 – 2022
10:30	10:45	O-014	Thomas Soseco	Universitas Negeri Malang, Indonesia	Women's Economic Engagement and Decision-Making in the Conversion to Cleaner Energy
10:45	11:00	O-016	Ratu Putri Intan Shafira	Universitas Islam Negeri Sultan Maulana Hasanuddin Banten Indonesia	English for Business to Improve Sales in Indonesian SME and Going Global in 5.0 Era
11:00	11:15	O-020	Agus Supriyadi	Bappelitbangda Kota Banjar, Provinsi Jawa Barat	Community Resilience Development Based on KB Village (Kampung KB) that Supports Sustainable City Development, Evidence Banjar Municipality
11:15	11:30	O-001	LATIFAH NUR AINI	Indonesia	BERSATU MENYONGSONG ILMIAH INDONESIA UNTUK MASA DEPAN BANGSA YANG MAJU DAN BERKELANJUTAN



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25 Agustus 2023

Session 4.2

Session chairs: Bambang Trigunaryah & Teguh Haryo Sasongko

Time start	Time end	Abstract #	Name	Institution	Title	
13:30	13:50	ID-023	Sitti Maesuri Patahuddin	University of Canberra, Australia	Exploring Gender Disparities in Facebook Usage Among Teachers: Striving to Close Gender Disparities in Teacher Professional Development	
13:50	14:10	ID-007	Andante Hadi Pandyaswargo	Waseda University, Jepang	Smart Technologies May Boost Growth, but Understanding People's Challenges Is Key	
14:10	14:25	O-028	Kevin William Andri Siahaan	Universitas HKBP Nommensen Pematangsiantar	STUDENT PERCEPTIONS OF THE EFFECTIVENESS OF USING COMPUTER SIMULATION AND ANIMATION IN CHEMISTRY LEARNING IN SENIOR HIGH SCHOOLS IN INDONESIA	
14:25	14:40	O-025	Aghesna Rahmatika Kesuma	UIN Raden Intan Lampung Indonesia	APPLICATION OF GREEN LIBRARY CONCEPT IN IMPROVING LIBRARIAN PERFORMANCE	
14:40	14:55	O-019	Alhamuddin	Universitas Islam Bandung	Arabilitas: Website-Based Arabic Language Learning Application and Teaching Materials For Students With Disabilities In Higher Education	
14:55	15:25	Break				
15:25	15:45	ID-026	Riskina Juwita	Tokyo University of Agriculture, Japan	Sixth Industrialization in Indonesian Nutmeg Production : Utilization of Local Agricultural Resources for Rural Development	
15:45	16:00	O-006	Susanto	Universitas Bandar Lampung	LinguaForense: Prototipe Aplikasi Berbasis Python untuk Analisis Linguistik Forensik	
16:00	16:15	O-007	Mukhamad Angga Gumilang	Politeknik Negeri Jember Indonesia	Hate Speech Intolerant Analysis Detection: A Proposed Method	
16:15	16:30	O-010	Ani Nur Karimah	Universitas Airlangga Indonesia	Komunitas Bawean Baru: Kehidupan orang-orang Bawean di Tulungagung tahun 1942-1990	
16:30	16:45	O-024	Dr. Fitria Dewi Navisa, SH, MKn, MH	Universitas Islam Malang, Indonesia	Urgensi Pemanfaatan Obligasi Daerah Sebagai Upaya Pembiayaan Pembangunan Daerah	
16:45	17:00	O-005	Ahmad Fauzan Baihaqi.,M.Hum	Departemen Sosial	tba	



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Forum Ilmiah Diaspora Indonesia

25 Agustus 2023 Poster Session

Abstract #	Name	Institution	Title
P-001	Anis Siti Nurrohkayati	Universitas Muhammadiyah Kalimantan Timur/ Indonesia	Chopping Machines Prototype as an Organic Waste Processor
P-002	NABILLA DEWI SEPTIANI	Indian Institute of Technology Madras, India	Amine-Modified Zeolite as a Solid Sorbent for CO ₂ Capture
P-003	Rike Syahniar	Universitas Muhammadiyah Jakarta, Indonesia	Antimicrobial resistance of nasal Staphylococcus species in lactating mothers and their infants
P-004	Hariyatun	Badan Riset dan Inovasi Nasional (BRIN), Indonesia	Development of engineered modular endolysin as antimicrobial candidate
P-005	Mohammad Hamzah Fauzi	BRIN, Indonesia	Synthesizing 2h/e ² resistance plateau at the first Landau level confined in a quantum point contact
P-006	Yayuk Hidayah	Universitas Negeri Yogyakarta, Indonesia	Menuju 2045: Mengintegrasikan Potensi Ilmiah Indonesia Menuju Kemajuan dan Keberlanjutan Bangsa
P-007	Putu Teta Prihartini Aryanti	Universitas Jenderal Achmad Yani, Cimahi - Indonesia	Negatively Charged Tight SPSf/PEG400/Halloysite Nanotube Ultrafiltration Membrane for High Removal Efficiency of Dyes
P-008	Lia Amalia Amrina	Universitas Gadjah Mada Yogyakarta	LINGUISTIC LANDSCAPE ON COFFEE SHOPS SIGNBOARD IN YOGYAKARTA
P-009	Andi Cudai Nur	Universitas Negeri Makassar	The Influence of Market Orientation on Marketing Performance in Micro Enterprises in the Trade Sector in South Sulawesi.
P-010	Amalina Ghaisani Komarudin	Pusat Riset Biologi Molekuler Eijkman BRIN, Indonesia	The D-enantiomer of LL-37 shows comparable antiviral activity against Zika virus as the native form of LL-37



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Forum Ilmiah Diaspora Indonesia

26 Agustus 2023

Time start	Time end	Parallel Session A	Parallel Session B
9:00	10:00	Workshop on Capacity Building (<i>Scientific writing</i>) - Dr. Dwi Susanto (University of Maryland)	Workshop on Mentoring (<i>Building a research group</i>) - Dr. Muhammad Aziz (The University of Tokyo)
10:00	10:30	Break	
10:30	11:30	Workshop on Capacity Building (<i>Communicating your research</i>) - Dr. I Made Andi Arsana (Universitas Gadjah Mada)	Workshop on Mentoring (<i>Research collaboration with industry</i>) - Dr. Bambang Trigunaryah (RMIT University)
11:30	12:00	Closing of FIDI 2023	
12:00	13:30	Lunch	



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Abstract

Session 1.1



Edi Suprayoga

Badan Riset dan Inovasi Nasional (BRIN), Indonesia

Comparative Study of Thermoelectric Properties of MoX_2 ($X = \text{S}, \text{Se}, \text{Te}$) Using First Principle Calculation

We have done a comparative study on the thermoelectric properties of monolayer MoX_2 ($X = \text{S}, \text{Se}, \text{Te}$). In this research, we use density functional theory and Boltzmann transport equation to calculate electronic structure, lattice thermal conductivity, and thermoelectric properties for each monolayer MoX_2 material. This research shows that all of the MoX_2 materials is a direct semiconductor with varying bandgap. This research also reveals that the X atom can affect the electronic structure, which will affect the thermoelectric properties of these materials. Furthermore, This research shows that MoSe_2 has the highest thermoelectric power factor at 550 K but surprisingly, MoTe_2 has the highest ZT of 1.17 due to its poor lattice thermal conductivity.

Julio

Badan Riset dan Inovasi Nasional (BRIN), KST Habibie, Indonesia

Probing New Physics via Flavor-violating Processes

Massive neutrinos are the only conclusive evidence so far for the existence of a theory beyond the Standard Model (SM). In spite of this, their origin remains unknown. Several models have been proposed, but testing those are hampered by the tiny nature of neutrino masses, thought to be effects of new physics at high-energy scale. Beside neutrino masses, new physics effects can appear as phenomena not predicted by the SM, such as a discovery of new Higgs along with the 125-GeV Higgs boson, flavor-violating type processes, and any measurements that deviate significantly from SM values, to name a few. The latter is of particular interest due to recent discrepancies found in muon anomalous magnetic moment and W-boson mass measurements.

The model to be discussed is a radiative mass model, in which neutrino masses are generated via higher-order perturbative corrections. Such a mechanism allows more suppression factors, so the new physics scale could be within reach of ongoing experiments. However, introducing a neutrino mass model at, say TeV scale, which exhibits large mixings, may also induce charged-lepton-flavor-violating (cLFV) processes. So far, none of these processes are observed, and they are strongly constrained by data.

I will present a model of neutrino mass that can also induce such flavor-violating couplings, namely the Zee model. It is an extension of the two-Higgs-doublet model with a singly-charged boson. Neutrino masses arise through these new particle exchanges at the one-loop level. Thanks to the symmetry of the model, flavor-violating decays will be induced, in particular the electron-muon type coupling whose signature was recently reported by the CMS Collaboration. I would like to show the compatibility between this excess and neutrino data, together with any other possible cLFV decays. Additionally, its ability to solve the muon $g-2$ and W-mass problems will also be discussed.



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Abstract

Session 1.1



Forum Ilmiah Diaspora Indonesia

Rudini Mulya

Universitas Trisakti, Indonesia

Ratiometric Optical Oxygen Sensor Based on Perovskite Quantum Dots and Rh110 Embedded in An Ethyl Cellulose Matrix

Ratiometric optical sensor gas sensing continues to develop optical sensing techniques and materials used in various industrial and environmental applications. This research focuses on a new ratiometric optical sensor using the development of new material of FAPbI₃ perovskite QDs and a simple method to detect oxygen (O₂) gas. FAPbI₃ perovskite QDs are used as an indicator of oxygen gas, and rhodamine 110 (Rh 110) is a reference material in a ratiometric optical sensor. All of the sensing and reference materials are embedded in an ethyl cellulose (EC) matrix and coated on the surface of the filter paper. Using a UV LED with a central wavelength of 380 nm as the excitation light source, the emission spectra results show that the emission wavelengths of the oxygen-sensitive dye (O₂) FAPbI₃ perovskite QDs do not overlap with the Rh 110 reference signal. Thus, oxygen concentration can be measured using a ratiometric fluorescence reference-based approach. The sensing signal will be obtained in the presence of analyte gas in the ratiometric sensitivity of R₀/R₁₀₀, where R₀ and R₁₀₀ represent the luminescence intensity detected in 100% nitrogen and 100% oxygen concentrations, respectively. The experimental results show the optical oxygen sensor's sensitivity as R₀/R₁₀₀ = 12.7. In addition, the response time and recovery of the oxygen gas sensor produced are 75 s and 93 s, respectively. The use of a new type of FAPbI₃ perovskite QDs material has been successfully developed in the optical ratiometric sensor for oxygen gas. The sensor proposed in this study has a low cost and easy fabrication process. The effect of spurious fluctuations in the excitation source intensity can be suppressed by the ratiometric optical sensing method.

Andhika Prima Prasetyo

Pusat Riset Konservasi SD Laut dan Perairan Darat, BRIN, Indonesia

Shark-dust: Application of High-throughput DNA Sequencing of Processing Residues for Trade Monitoring of Threatened Sharks and Rays

Illegal fishing, unregulated bycatch, and market demand for certain products (e.g. fins) are largely responsible for the rapid global decline of shark and ray populations. Controlling trade of endangered species remains difficult due to product variety, taxonomic ambiguity and trade complexity. The genetic tools traditionally used to identify traded species typically target individual tissue samples, and are time-consuming and/or species-specific. Here, we performed high-throughput sequencing of trace DNA fragments retrieved from dust and scraps left behind by trade activities. We metabarcoded 'shark-dust' samples from seven processing plants in the world's biggest shark landing site (Java, Indonesia), and identified 61 shark and ray taxa (representing half of all chondrichthyan orders), more than half of which could not be recovered from tissue samples collected in parallel from the same sites. Importantly, over 80% of shark-dust sequences were found to belong to CITES-listed species. We argue that this approach is likely to become a powerful and cost-effective monitoring tool wherever wildlife is traded.

Keywords: Elasmobranchs, trade monitoring, DNA metabarcoding, environmental DNA, Indonesia



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Abstract

Session 1.1



Muhammad Wahyudin Lewaru

Departemen Ilmu Kelautan, Universitas Padjadjaran, Indonesia

Diversity of Bacterial in Muara Gembong Estuary, Citarum River, West Java, Indonesia

Muara Gembong is a downstream region of the Citarum watershed that has runoff from anthropogenic activities and has an impact on water pollution. In overcoming the problem of pollution, bacteria can be utilized as a remediation agent. However, the information on the bacterial community structure in Muara Gembong is very low. This study aims to identify the composition and bacteria profile of Muara Gembong waters with a metagenomic approach to the Next Generation Sequencing (NGS) method and determine the abundance of water parameters. Water samples taken at two stations with different characteristics were carried out in October 2019. Sample processing and data analysis were conducted in October 2019–April 2020 at the Laboratory of Microbiology and Molecular Biotechnology, Faculty of Fisheries and Marine Science, Universitas Padjadjaran and Novogene Singapore. Estuary water samples were enriched with a 0.2 nutrient broth medium concentration. The NGS Novaseq Illumina method with variable regions V3 - V4 (341F and 806R) was used in this research. The results identified 37 genera, 19 families, 13 orders, 7 classes, and 4 bacterial phyla, with the number of Operational Taxonomy Units (OTU) of samples for A1 being 49 and A2 being 48. The highest abundance was obtained by the Gammaproteobacteria class (99.82%), which is dominated by the *Vibrio* genera. The level of diversity is classified as medium with high dominance. The abundance and diversity variability of the bacterial community at both stations are influenced by environmental conditions such as water temperature, salinity, pH, DO, total nitrogen (TN), and total suspended solid (TSS).

Rahmita Sari Rafdinal

P.S. Mitsubishi Construction Co., Ltd, Japan

Collaboration Work Between Japan and Indonesia on The Development of New Technology for Corrosion Protection and Remote Monitoring for Bridge Structure

Corrosion of steel rebar in bridge structures is a growing issue worldwide. Repair technology against corrosion damage in Indonesia uses common methods such as painting or patching repair. These methods are simple and easy to apply to the damaged concrete structure. However, those methods cannot control rebar corrosion in concrete, deterioration will occur again, and the engineer cannot monitor corrosion. Hence Indonesia needs new enhancements in the corrosion repair methods and monitors the condition of the structure after repair. Therefore, collaboration application research between Japan and Indonesia on corrosion protection for bridge structures in Indonesia to solve that problems was carried out by employing sacrificial anode cathodic protection as new corrosion repair technology namely Zinc Cartridge and a corrosion monitoring system based on wireless information and communication technology by using Titanium Wire (Ti-Wire) Sensor. Transfer technology from Japan to Indonesia in this collaboration work performed by experimental work in the laboratory and actual work in the bridge structure. Local material was used and developed to support this new technology issue. Currently, the Zinc Cartridge and Ti-Wire Sensor were applied to three national bridges and one of the long-span bridges in Indonesia namely the Suramadu Bridge. From the reported work, it can be concluded that Zinc Cartridge by using local material affords excellent to protect the steel bar in concrete against corrosion, and Ti-Wire Sensor is reliable be used as a reference electrode to observe the repair progress embedded in concrete and effectively transmits the real-time data of corrosion monitoring of rebar in concrete by time dependency.



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Session 1.1



Indarta Kuncoro Aji

PT Kakiatna Enjiniring, Indonesia & Molten Salt Lab. Inc., Japan

Pengembangan Teknologi Molten Salt Indonesia – Jepang

Molten salt merupakan material yang saat ini tengah ramai diperbincangkan, yang mana salah satu fungsinya adalah sebagai media transfer panas. Penggunaan molten salt sebagai media transfer panas pada beberapa jenis pembangkit listrik dianggap lebih baik karena mampu meningkatkan nilai efisiensi dibandingkan dengan menggunakan air, hal ini dikarenakan molten salt yang memiliki temperatur operasional jauh lebih tinggi dibandingkan dengan air.

Selain itu, molten salt juga dapat digunakan sebagai media penyimpan energi berupa panas yang dikenal sebagai latent heat energy storage. Teknologi ini juga tengah dikembangkan di banyak negara dengan tujuan untuk menyimpan panas dari sinar matahari.

Selain kelebihan yang dimilikinya, molten salt juga memiliki beberapa permasalahan yang perlu diselesaikan sebelum teknologi molten salt dapat diaplikasikan secara komersial.



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Session 1.2



Mahardhika Pratama

University of South Australia, Australia

Handling Dynamic Worlds with Continual and Autonomous Machine Learning

Dynamic environments are one of the most challenging problems for deep learning (DL) where its fundamental design principle lies in the i.i.d assumption between the training stage and the deployment stage. This problem results in inaccurate predictions of DL because changes cause a deep model to be quickly outdated to represent the current concept. My talk will start from the problem of evolving data streams which can be regarded as a single non-stationary learning task. The evolving data stream problem suffers from drifting distributions calling for a self-adaptive model, capable of quickly adapting from concept drifts. We will discuss the cross-domain stream learning topic where a model is deployed in multiple streams suffering from the issue of domain shifts. After that, my talk will extend to the problem of continual learning where a model encounters a sequence of different learning tasks. The goal is to master these tasks efficiently without the catastrophic forgetting problem. Several advanced topics in continual learning will be covered in my talk.

Muhammad Syafrudin

Sejong University, Republic of Korea

Applications of Industrial Internet of Things

This presentation offers a concise overview of the major components of the Internet of Things (IoT), including its introduction, technology trends, lifecycle, architecture, and applications in manufacturing and indoor real-time location systems. It discusses the concept of interconnected devices and systems, highlighting the immense potential and opportunities provided by the IoT. The presentation delves into technological advancements such as edge computing, artificial intelligence, and machine learning that are shaping the future of IoT. A detailed description of the IoT architecture is provided, encompassing sensors, communication protocols, gateways, cloud platforms, and data analytics. Two practical examples are discussed: monitoring in manufacturing to enhance operational efficiency and revolutionizing asset management and safety in indoor real-time location systems. By attending the presentation, participants will gain a comprehensive understanding of IoT's trends, lifecycle, architecture, and real-world applications, empowering them to drive innovation and transformation across various sectors.



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Session 1.2



Forum Ilmiah Diaspora Indonesia

Agustian Taufiq Asyhari

Monash University, Indonesia, and Birmingham City University, UK

Applications of Industrial Internet of Things

This presentation offers a concise overview of the major components of the Internet of Things (IoT), including its introduction, technology trends, lifecycle, architecture, and applications in manufacturing and indoor real-time location systems. It discusses the concept of interconnected devices and systems, highlighting the immense potential and opportunities provided by the IoT. The presentation delves into technological advancements such as edge computing, artificial intelligence, and machine learning that are shaping the future of IoT. A detailed description of the IoT architecture is provided, encompassing sensors, communication protocols, gateways, cloud platforms, and data analytics. Two practical examples are discussed: monitoring in manufacturing to enhance operational efficiency and revolutionizing asset management and safety in indoor real-time location systems. By attending the presentation, participants will gain a comprehensive understanding of IoT's trends, lifecycle, architecture, and real-world applications, empowering them to drive innovation and transformation across various sectors.

Hermawan Nugroho

University of Nottingham Malaysia

Embedded System for Plant Disease Detection

Agriculture continues to be considered one of the most important industries, despite the growth of various other industries due to its importance as the primary food source and in international trade. However, the development of plant diseases has led to the destruction of numerous agricultural crops, severely impacting society, the environment, and the economy. Plant disease detection systems based on deep learning approaches are being investigated in order to reduce the amount of manual labor required in these agricultural tasks. As a foundation for real-time detection research, pre-trained models are trained on the assembled dataset and tested for accuracy, model size, training efficiency, and inference time. The selection model will be selected for deployment after filtering and training changes are completed. Next, the deep learning model is used to create a plant disease detection algorithm and will be run on an embedded device to act as a foundation for research on real-time detection.



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Abstract

Session 1.2



Indra Chandra

Universitas Telkom, Indonesia

Membangun Kemandirian Bangsa dengan Sistem Pemantauan Lingkungan yang Terintegrasi

Sistem pemantauan lingkungan yang terintegrasi merupakan komponen penting dalam membangun kemandirian bangsa dalam menghadapi tantangan lingkungan. Untuk mencapai hal ini, beberapa aspek yang relevan perlu diperhatikan secara sistematis. Pertama, pengembangan mikrosensor dan instrumentasi analitik menjadi kebutuhan mendesak dalam pemantauan lingkungan. Teknologi mikrosensor dapat memberikan data pemantauan lingkungan secara real-time dengan biaya yang lebih rendah, sehingga perlu untuk melanjutkan pengembangan dan penerapan teknologi ini.

Selanjutnya, pengembangan sistem kalibrasi mikrosensor baik di laboratorium maupun in-situ menjadi hal yang krusial. Sistem kalibrasi yang terstandarisasi akan memastikan akurasi dan konsistensi pengukuran mikrosensor, sehingga data yang dihasilkan dapat dipercaya. Integrasi mikrosensor dengan alat ukur referensi yang terkalibrasi juga perlu diperhatikan untuk memastikan konsistensi dan validitas data yang dihasilkan.

Selain itu, penting untuk menerapkan sistem Quality of Service (QoS), Quality Control (QC), dan validasi data yang berbasis statistik. Dengan mengacu pada parameter seperti presisi, bias, linieritas, dan error, dapat dilakukan verifikasi data yang dihasilkan dan memastikan keberterimaan data dalam pemantauan lingkungan.

Dalam hal pemeliharaan dan pengelolaan sistem, mekanisme service dan maintenance serta adanya dashboard monitoring system yang lengkap sangat diperlukan. Pemeliharaan rutin dan penanganan permasalahan yang tepat waktu akan menjaga kinerja sistem pemantauan lingkungan. Dashboard monitoring system yang komprehensif akan memberikan informasi yang jelas dan mudah dipahami tentang kondisi lingkungan secara keseluruhan.

Pembangunan kapasitas dan kapabilitas Sumber Daya Manusia (SDM) merupakan elemen penting dalam mencapai kemandirian bangsa dalam pemantauan lingkungan. Pelatihan dan pendidikan yang tepat akan membantu mengembangkan keahlian dan pengetahuan yang diperlukan dalam penggunaan dan pemeliharaan sistem pemantauan yang terintegrasi.

Terakhir, keberlanjutan program pemantauan lingkungan dan mengatasi tantangan yang ada menjadi faktor penentu. Dukungan yang berkelanjutan dari pemerintah, pemangku kepentingan, dan masyarakat diperlukan untuk menjaga keberlanjutan program ini. Tantangan seperti pembiayaan, infrastruktur, dan perkembangan teknologi harus ditangani secara efektif agar sistem pemantauan lingkungan dapat berfungsi secara optimal.



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Session 1.2



Forum Ilmiah Diaspora Indonesia

Wirawan Ciptonugroho

Universitas Sebelas Maret, Indonesia

Mono And Bifunctional Heterogeneous Catalyst for Biobased Chemical Transformation

Heterogeneous catalyst is highly pivotal to accelerate chemical reactions efficiently. This feature is essential to facilitate efficient biomass transformation to valuable products. In my presentation, the catalysts with single and multifunctional active sites successfully transformed renewable chemicals to added value products. Moreover, the use of immiscible multiphasic catalytic system in hydrodeoxygenation over hydrophobised catalysts was studied showing that phenol transformation to cycloalkane can be facilitated at considerably milder conditions with high selectivity towards the desirable product.

Wahyu Satpriyo Putro

AIST, Japan

Time has Come to Industrialize Transformation of Bio-based SiO₂ into Si-based Chemicals

Silicon, mostly found as silica (SiO₂) or silicates (Si₂O₃·2H₂O), which is the most abundant element, comprising more than 40% of the earth's crust, serves as primary sources for silicon polymers, photovoltaics, and chemicals. Based on BPS data, the annual production of rice husk (contained 85% of SiO₂) in Indonesia achieves 15 million tons, which much exceeds from the silica world's demand estimated to 1.5 million tons. It clearly indicates that the natural SiO₂ source from Indonesia possesses high potential to supply the silica needs.

High strength of the Si-O bond (100 kcal/mol) making the manipulative fashion into useful chemicals is of "grand challenge" for silicon chemist. Current industrial processes mostly start the SiO₂ transformed to, so called metallurgical grade Si (Si(MG), ca 86% purity), through carbothermal reduction carried out in 1900 °C-arc furnace tools. This high-energy intensive process requires 10-11 kWh to produce one kilogram of Si(MG), with electrically accounting for 40% of the total production cost. Indeed, this process is unfavorable for industrial profit and environment. The Si(MG) is subsequently converted to various commodities including solar-grade Si(SG) through Siemens or Union Carbide processes, Me₂SiCl₂ via Rochow-Muller process or alkoxy silane (TROS) production. Herein, the direct formation of silicon chemicals from silica through non-redox process is highly desired.

The rational design to overcoming the conventional fashion should rely on the development of chemical methods starting from renewable feedstock or abundant precursor. In this forum, the discussion will be focused on the development of how the SiO₂ could be transformed in one-step process to the raw Si chemicals including Si(SG), TROS, or SiCl₄. Several insight including thermodynamic studies, density functional theory (DFT) calculation and techno-economic assessments are provided to see the potential utility on industrial application.



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Abstract

Session 1.2



Forum Ilmiah Diaspora Indonesia

Mujiyanto

Badan Riset dan Inovasi Nasional (BRIN), Indonesia

Association of benthic life species on the surface Lobster Artificial Reef in Prigi Bay East Java

Rehabilitation techniques using Artificial Reef media are currently one of the most efficient alternatives for habitat restoration as an impact destructive fishing. Significant degradation of lobster fisheries production occurs due to environmental changes and some human activities. This study aims to analyse the association of benthic life after three years (December 2016) of being placed on the bottom of the waters in Prigi Bay, East Java. Data on the presence of benthic life was collected by the Stationary Visual Census method at the artificial unit in Prigi Bay, East Java. Data collected did in May 2019. Found as many as 69 species from all sides at three units. In addition to the benthic life, community composition also found biota from the money coral group, gastropods as natural food for lobsters and several groups of echinoderms. Some gastropods were present too at holes in each module and associated with algae such as *Halchondria lutea*, *Terpios manglaris* and *Bursatella leachi*. To know the effectiveness needs necessary to study the effectiveness of using artificial for developing natural lobsters by focusing on the community's perspective as direct users of natural lobster resources.

Ali Rahmat

Badan Riset dan Inovasi Nasional (BRIN), Indonesia

Characteristics of Durian Seeds Biochar at Different Pyrolysis Temperatures

Indonesia as an agricultural country produces and consumes a huge amount of fruits. One of the popular fruits is durian (*Durio zibethinus*), which can create issues with the high amount of durian seeds. Durian seeds can be fermented quickly. Thus, if they are not processed immediately, it causes pollution to the environment, particularly an odor issue. One of the waste management is to convert durian seed waste into biochar, an ameliorant agent to improve soil quality. This study aims to analyze the physicochemical properties of durian seed-derived biochar under different pyrolysis temperatures. The results showed that the increases in the temperature allowed the creation of more porosity in the biochars, which is due to chemical structure and crystallinity arrangement. This is confirmed by the increases in surface area and total pore volume also decreases in particle size. The change in the chemical structure can be verified by the decreases in the biochar yield. The produced biochar from fruit seeds has excellent carbon content and elemental components such as potassium, magnesium, phosphor, and sulfur, informing prospective fruit seeds as a soil amendment fertilizer.



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Session 2.1



Jerome Irianto

Florida State University, USA

Genomic Heterogeneity in Pancreatic Cancer Organoids and Its Stability with Culture

The establishment of patient-derived pancreatic cancer organoid culture in recent years creates an exciting opportunity for researchers to perform a wide range of in vitro studies on a model that closely recapitulates the tumor. One of the outstanding question in pancreatic cancer biology is the causes and consequences of genomic heterogeneity observed in the disease. However, to use pancreatic cancer organoids as a model to study genomic variations, we need to first understand the degree of genomic heterogeneity and its stability within organoids. Here, we used single-cell whole-genome sequencing to investigate the genomic heterogeneity of two independent pancreatic cancer organoid lines, as well as their genomic stability with extended culture. Clonal populations with similar copy number profiles were observed within the organoids, and the proportion of these clones was shifted with extended culture, suggesting the growth advantage of some clones. However, sub-clonal genomic heterogeneity was also observed within each clonal population, indicating the genomic instability of the pancreatic cancer cells themselves. Furthermore, our transcriptomic analysis also revealed a positive correlation between copy number alterations and gene expression regulation, suggesting the "gene dosage" effect of these copy number alterations that translates to gene expression regulation.

Susanti Susanti

Cancer Research UK Beatson Institute, Glasgow UK & Faculty of Pharmacy, Universitas Muhammadiyah Purwokerto, Indonesia

Investigating the Early Onset Colorectal Cancer

The incidence of young patients under 50 years old with colorectal cancer (CRC) is approximately three times higher in Indonesia compared to Europe, the UK, and the USA. Typically, the development of sporadic colorectal tumours could take up to 50 years (according to a mathematical model). However, it has been found that CRC in young patients may require some form of "accelerated carcinogenesis." This acceleration may occur in the context of inherited diseases such as Lynch Syndrome (LS), although only around 15% of Early-Onset Colorectal Cancers (EOCRC) are associated with known hereditary forms of the disease.

The aim of this study was to investigate the biology of EOCRC, focusing on the tumour phenotypes and microenvironment in permitting accelerated carcinogenesis. This study utilised a series of formalin-fixed, paraffin-embedded (FFPE) tumour tissues EOCRC with grade and stage-matched late-onset colorectal cancer (LOCRC) in Indonesia and UK.

The results of this study showed:

A higher frequency of LS may contribute to a higher proportion of EOCRC cases in Indonesia. MSI CRC in Indonesian CRC showed lower BRAF mutation and lower MLH1 methylation, yet higher KRAS and PIK3CA mutations. Confirmation of the similarity of the majority of clinicopathology and some molecular features between young and older CRC patients both in Indonesia and the UK. Confirmation that EOCRC is significantly associated with signet ring cell tumours, metastasis, and CRC-related death. EOCRC shows higher expression of genes related to angiogenesis, interferon, MAPK, NFKb, hypoxia, apoptosis, matrix remodelling, and metastasis.

Further studies will be directed to better understand the potential biological factors that may contribute to the rise of EOCRC, such as epigenetic and microbiome landscape.



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Session 2.1



Forum Ilmiah Diaspora Indonesia

Jessica Rusli

ITB, ISTA Indonesia

Hepatocyte Targeted Aptamer Nanoparticle Modification For Delivery of Angiotensinogen siRNA In vitro

The prevalence of hypertension worldwide has increased to reach 1.28 billion people in 2021 according to WHO. This increase was mainly due to an increase in hypertension risk factors in this population. Hypertension in humans is a risk factor for stroke, heart attack, heart failure, arterial aneurysm and is the main cause of chronic heart failure. Hypertension can be reduced by taking drugs regularly throughout the patient's life. In taking hypertension drugs there are several side effects that can be experienced by hypertension sufferers. These side effects include constipation, dizziness, fatigue, nausea and swelling of both legs. A more effective breakthrough in hypertension treatment is needed, which means that sufferers do not need to take medication every day and minimize drug side effects. More effective treatment of hypertension can be achieved with a genetic approach through the inhibition of specific gene expression. This genetic approach is known as RNA interference (RNAi). Hypertension is closely related to blood pressure regulation carried out by the Renin Angiotensin System (RAS). One of the RAS components that affect blood pressure is the protein angiotensinogen. Angiotensinogen is produced in liver cells (hepatocytes) and is the only precursor of angiotensin I (AGT I), which is one of the causes of increased blood pressure. Therefore, inhibition of angiotensinogen gene expression in hepatocytes is expected to reduce the concentration of angiotensinogen protein which will ultimately reduce blood pressure. In RNAi, siRNA (small interfering RNA) is used, which is double-stranded RNA of less than 30 base pairs and has 3 nucleotides hanging at both ends. The design of the angiotensinogen siRNA used was: 5'- UCGUCUCCAGCACGACUUdTdT-3' (sense) and 3'- dTdTAGCAGAAGGUCGUGCUGAA-5' (antisense) with a low homology angiotensinogen mRNA target: 5'- UCGUCUCCAGCACGACUU- 3'. The effectiveness of hypertension treatment can be increased by combining angiotensinogen siRNA and modified aptamer nanoparticles to form chimeras. The absence of chimeric aptamer- angiotensinogen siRNA synthesis with angiotensinogen mRNA targets in hepatocytes as an alternative treatment for hypertension has prompted this research. Single-stranded RNA as an aptamer was selected based on its affinity for RALA255-G10 cells (rat hepatocytes cell line) in vitro using the Cell-Systematic Evolution of Ligands by Exponential Enrichment (Cell-SELEX) method. In this study there were two experimental groups. Group 1 was siRNA angiotensinogen-RNA chimera aptamer with naphtyl modification and group 2 was the control group (siRNA angiotensinogen-RNA aptamer chimera without modification). Each group consisted of 3 sequences taken based on the affinity of each candidate RNA aptamer for RALA255-G10 cells. The existence of a siRNA angiotensinogen-RNA aptamer chimera with naphtyl modification is expected to make it easier for angiotensinogen siRNA to enter RALA255-G10 cells and inhibit their expression. Inhibited expression of the angiotensinogen gene will lead to a decrease in the concentration of angiotensinogen protein which in turn is expected to cause a decrease in blood pressure.

Keywords : Angiotensinogen, Aptamer, Hypertension, SELEX, siRNA



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Session 2.1



Siti Aisyah

Universitas Bangka Belitung, Indonesia

Morphometry-Molecular Studies and Blood Characteristics of Horseshoe Crab for the Species Sustainability in Tanjung Punai West Bangka

Belangkas memiliki nilai ekonomi penting yaitu dapat digunakan dalam bidang biomedis dan farmasi terutama yang berhubungan dengan tes endotoksin yang dikenal dengan Limulus Ameobocyte Lysate (LAL) tes. Di Indonesia belangkas dianggap sebagai hewan laut primitif (primitive marine animal) dan sudah dikelompokkan ke dalam kategori rawan atau jarang. Di Kepulauan Bangka Belitung sendiri masih terbatasnya penelitian mengenai belangkas. Keberadaan belangkas yang sering ditemukan berada di perairan Tanjung Punai, Kabupaten Bangka Barat. Namun hingga saat ini belum ada informasi lebih lanjut mengenai spesies belangkas yang ada di lokasi tersebut. Masih minimnya penelitian belangkas di Pulau Bangka dan pentingnya manfaat darah belangkas serta pengelolaannya maka penelitian ini berupaya untuk mengidentifikasi jenis belangkas secara morfometrik dan molekuler serta mengkarakterisasi kandungan yang terdapat di dalam darah belangkas seperti fenol, flavonoid, dan alkaloid yang berpotensi dalam pengujian endotoksin untuk produk kesehatan. Hasil identifikasi morfologi dan molekuler gen Cytochrome Oxidase Subunit 1 (COI) sampel belangkas dengan menggunakan program BLAST yang terintegrasi pada laman GenBank teridentifikasi sebagai spesies *Carcinoscorpius rotundicauda* (Latreille, 1802) dan *Tachypleus gigas* (O.F. Muller, 1785). Berdasarkan hasil pengujian ekstrak darah mimi (*Tachypleus gigas*) yang dilakukan secara duplo menghasilkan kadar total fenolik sampel CR sebesar 5,815 mg EAG/g, flavonoid sebesar 142.0494 ppm, dan kadar alkaloid sebesar 42.1333 ppm. Kadar total fenolik untuk sampel TG sebesar 7,05 mg EAG/g.



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Session 2.1



Forum Ilmiah Diaspora Indonesia

Sri Jayanti

Pusat Riset Biologi Molekuler Eijkman, Organisasi Riset Kesehatan, BRIN, Indonesia

Wajah Janus Bilirubin: Dari Toksisitas Neonatal Hingga Potensi Perlindungan pada Penyakit Neurodegeneratif

Bilirubin tak terkonjugasi (unconjugated bilirubin, UCB) adalah metabolit katabolisme heme dan memiliki wajah Janus karena memiliki efek neurotoksisitas dan neuroprotektif. UCB dapat menyebabkan neurotoksisitas pada neonatus (kernikterus) dan menyebabkan gangguan neurologis dan kematian sebagai konsekuensinya. Sebagai pendekatan alternatif untuk fototerapi atau transfusi tukar yang merupakan pengobatan standar untuk neonatal hiperbilirubinemia, kami menguji kurkumin (curcumin, Curc). Kami menggunakan tikus Gunn sebagai model kernikterus. Curc memberikan perlindungan penuh dari hipoplasia serebelar (tanda toksisitas bilirubin pada model hewan kernikterus) yang ditandai dengan normalisasi berat, jumlah sel dan lapisan arsitektur cerebellum dan pemulihan kemampuan koordinasi motorik. Kami menemukan peradangan (termasuk kadar mRNA dan protein TNF- α), ketidakseimbangan redoks, dan neurotoksisitas glutamat di antara mekanisme molekuler yang dinormalisasi oleh Curc. Kemampuannya untuk mencegah kerusakan tanpa menurunkan kadar serum bilirubin menunjukkan efek langsung Curc pada mekanisme kerusakan di otak. Hasil studi ini menunjukkan potensi Curc dalam skenario klinis, terutama dalam keadaan di mana fototerapi dan transfusi tukar tidak dapat dilakukan.

Wajah kedua dari bilirubin yang dieksplor dalam proyek kami adalah potensi neuroprotektifnya. Peningkatan level bilirubin yang ringan (contoh populasi sindrom Gilbert), terbukti memberi perlindungan dari berbagai penyakit seperti penyakit kardiovaskular, diabetes, kanker, multiple sclerosis dan glioma. Namun, peran UCB masih belum diketahui pada penyakit Parkinson (Parkinson's disease, PD) yang merupakan gangguan neurologis dengan pertumbuhan tercepat dan belum memiliki terapi modifikasi. Berdasarkan latar belakang ini, potensi terapi UCB pada PD diuji. Efek neuroprotektif dari UCB konsentrasi rendah (0,5-4 μ M) diinvestigasi dalam model PD (kultur organotipik dari substansia nigra) yang diinduksi dengan rotenone (Rot) dosis rendah. UCB 0,5 dan 1 μ M sepenuhnya melindungi dari hilangnya neuron TH+ (neuron dopaminergik, DOPAn). Peradangan, khususnya tumor necrosis factor alpha (TNF- α), ditemukan sebagai kunci perlindungan UCB terhadap DOPAn. Studi lebih lanjut diperlukan untuk penggunaan UCB di klinik, tetapi TNF- α mungkin memainkan peran kunci dalam merancang pilihan terapi untuk PD.



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Astri Nur Faizah

National Institute of Infectious Diseases, Japan

Non-Pathogenic Microbiome as Potential Biocontrol Agents for Vector-Borne Viral Diseases

About 75% of emerging infectious diseases are zoonotic in origin, which in turn represent zoonotic diseases (zoonoses) as a threat to global health. Zoonoses involve both animals and humans and are caused by pathogens such as viruses and may be transmitted through arthropod vectors. Some examples of vector-borne viral zoonoses (VBVZ) include La Crosse encephalitis (family Peribunyaviridae), Japanese encephalitis (Flaviviridae), and Chikungunya (Togaviridae) are all zoonotic and mosquito-borne. Global environmental and socioeconomic changes by human activities may have facilitated the emergence and re-emergence of vectorborne zoonoses in the world, for example by accidental imports of mosquitoes due to international human movements and sudden turns of sylvatic cycle of viral zoonoses due to disruptions of wildlife habitat. In order to prevent future emergence of vector-borne viral zoonoses, multisectoral collaboration and interdisciplinary partnerships, including environment, wildlife, and entomological sectors will be very much required.

With the absence of treatment and vaccine available for most vector-borne viral diseases, added with gradually-ineffective insecticides currently used to control the vectors, there is an urgency to find new approaches to control the disease circulation. Biological control (biocontrol) efforts have long been suggested as a promising strategy, however, this requires an in-depth look at the vectors' microbiome and interactions between the host, pathogens, and the non-pathogenic components harbored by the mosquitoes. Non-pathogenic insect-specific viruses (ISVs) have the potential to serve as biocontrol agents since they could not replicate in mammalian cells and have been indicated to modulate pathogenic viruses. Our studies showed that each mosquito species seems to have a diverse set of viruses (most of which are ISVs) and they might have important implications for the presence of vector-borne (pathogenic) viruses or otherwise. The ability of ISV in impacting pathogenic virus' infection in mosquitoes and further effect the disease spread deserves to be explored.



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Abstract

Session 2.1



Forum Ilmiah Diaspora Indonesia

Evita Yuliatul Wahidah

STAI Al Musaddadiyah Garut, Indonesia

Spirituality and Medical Resilience: A Case Study of Chronic Diseases in Adolescent and Elderly in Indonesia

The purpose of this research is to determine the level of spirituality and medical resilience in patients with chronic diseases which include: stroke, diabetes mellitus, hypertension, chronic kidney failure, cancer and heart failure. The research design used was a descriptive survey using the Resilience Scale (RS) questionnaire, to test the construct validity of the Connor-Davidson Resilience Scale (CD-RISC). The population in this study was chronic disease patients undergoing therapy including medical rehabilitation, physiotherapy, cognitive and emotional therapy for stroke patients. Hemodialysis therapy for heart failure patients. Chemotherapy surgery or radiation therapy for people with cancer. The study sample consisted of 255 patients who were selected using the consecutive sampling technique. Statistical analysis using univariate analysis and presented in the frequency distribution table.

The results of data collection on chronic disease patients included: stroke in 38 patients (15%), diabetes mellitus in 51 patients (20%), hypertension in 56 patients (22%), chronic kidney failure in 26 patients (10%), cancer in 38 patients (15%), and heart failure in 46 patients (18%).

At the level of spirituality and resilience, 222 patients (87%) had very high levels of spirituality and resilience, and 33 patients (13%) had high levels of spirituality and resilience. The resilience item chosen by most respondents strongly agreed, found in two characteristics, namely existential aloneness, in statement items carrying out therapeutic actions well (75%), and meaningfulness characteristics in the item I feel grateful to still be able to carry out therapeutic actions in life (80%), while the selected resilience items do not agree, that is, the characteristics of perversion on items can go through difficult times because they already have previous therapeutic experience in as many as 76 patients (30%). It can be concluded that spirituality and resilience in chronic disease patients undergoing therapy are very high. Based on the results of this study, it is recommended that the medical team collaborate to maintain the level of spirituality and resilience in patients by providing regular screening and counseling.

Devi Mekar Sari

Akademi Keperawatan YPTK Solok, Indonesia

Relationship Psychosocial Condition Patients Schizophrenia With Perceived Stigma By Patients Schizophrenia Hospital West Sumatra Barat

Stigma is negative view of society against schizophrenic patients gain stigmatization in society and family. Stigma causes psychosocial problem within the patient. This research aimed to determine the relationship of self-esteem, self-efficacy with the perceived stigma by people with mental disorders (PWMD). This research used cross-sectional study design by using random sampling method with 174 respondents. The result of the research revealed that there was no meaningful relationship between self-esteem, self-efficacy and perceived stigma. However, it found that there was a significant relationship with p -value = 0.008 between self-esteem and the perceived stigma by schizophrenic patients. Therefore it is recommended for families who caring for the patients with schizophrenic to be able to show positive emotional attitude through the good communication.



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Abstract

Session 2.2



R. Dwi Susanto

University of Maryland, College Park, USA

Saatnya Kita Memanen Listrik dari Laut

Suatu kehormatan Presiden Joko Widodo menjadi presiden G-20 dan kesempatan emas bagi Indonesia menunjukkan kita serius melakukan peralihan energi dari minyak bumi dan batu bara ke energi terbarukan, sesuai tujuan untuk mencapai nol emisi pada 2060. Bahkan, negara menargetkan, 23 persen kebutuhan energi dipenuhi energi terbarukan pada 2025. Memasuki akhir 2022, pencapaian energi baru dan terbarukan (EBT) baru 12 persen. Karena itu, kita harus melakukan lompatan dan investasi besar-besaran.

Dengan adanya kesepakatan Joint Energy Transition Partnership (JETP), salah satu hasil pertemuan G-20 pada November 2022 sudah saatnya kita membangun EBT dari laut. Syarat utama energi alternatif terbarukan adalah ramah lingkungan dan tahan perubahan iklim jangka panjang. Tak kalah penting, sebaiknya sesuai kelimpahan sumber daya lokal. Sumber EBT laut bisa dari gelombang laut, tinggi pasang surut, perbedaan suhu permukaan & dasar laut, dan arus laut. Dari ke-empat sumber ini yang paling potensi untuk dikembangkan adalah arus dan gelombang laut. Gabungan Arus lintas Indonesia (Arlindo) dan arus pasang surut sangat ideal sebagai sumber efektif untuk dikonversikan menjadi energi listrik. Selama masih ada matahari dan bulan, arus pasut selalu ada. Karena itu, arus laut ideal untuk sumber listrik karena bisa diprediksi, selalu ada, ramah lingkungan, dan sesuai kearifan lokal sebagai sumber daya laut yang melimpah.

Banyak selat-selat sempit kita yang mempunyai arus laut sangat besar > 2.5 meter/detik, yang ideal untuk dibangun Pusat Listrik Tenaga Arus Laut (PTAL). Teknologi untuk mewujudkan energi dari laut ini sudah ada dan bisa diterapkan di Indonesia. Berbagai jenis teknologi turbin untuk EBT laut yang bisa kembangkan sesuai dengan kondisi selat. Bahkan bisa dibangun "turbin farm" artinya banyak turbin di satu selat.

Dengan dibangunnya prototipe PTAL akan menggugah insinyur kita untuk menguasai teknologi dan universitas akan mengembangkan kurikulum bidang ini. Pusat energi terbarukan dari laut akan menjadi laboratorium riset dalam pengembangan teknologi ini dan daya tarik mahasiswa asing untuk kuliah di universitas kita sehingga bisa menaikkan peringkat universitas di kancah internasional.

Karena arus laut, sumbernya jelas tersedia dan melimpah, tinggal mengambil. Ibarat mau panen padinya sudah tersedia di sawah, siap dipanen dan teknologi untuk memanennya sudah ada. Maka, saatnya kita memanen listrik dari laut.



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Abstract

Session 2.2



Marolop Dapot Krisman Simanullang

Air Liquide, Research and Development, Innovation Campus Tokyo, Japan

Peranan R&D Industri dalam Pengembangan Energi Berbasis Hidrogen Melalui Kolaborasi dengan Akademia dan Pemerintah

Energi berbasis hidrogen merupakan salah satu solusi untuk mengatasi tantangan pengurangan gas rumah kaca dan ketergantungan dunia pada bahan bakar fosil. Air Liquide, sebagai salah satu pemain kunci dalam gas, teknologi, dan layanan untuk industri dan kesehatan, meyakini bahwa hidrogen akan memainkan peran penting dalam mencapai dua target tersebut dan telah berinvestasi untuk mengembangkannya sebagai sumber energi bersih selama bertahun-tahun. Selama 50 tahun terakhir, Air Liquide telah mengembangkan keahlian unik yang memungkinkannya memainkan peranan penting dalam seluruh rantai pasokan hidrogen, mulai dari produksi hingga distribusi, termasuk penyimpanan, pengiriman, dan pengembangan aplikasi untuk pengguna akhir, sehingga berkontribusi pada penggunaan hidrogen secara luas sebagai sumber energi bersih, khususnya untuk mobilitas.

Divisi Riset & Pengembangan (R&D) di Air Liquide memainkan peran penting dalam mewujudkan transisi energi berbasis hidrogen. Para peneliti Air Liquide, dengan berbagai profil dan keahlian, berkontribusi setiap hari untuk inovasi di berbagai bidang seperti mengembangkan produksi hidrogen netral emisi CO₂ hemat biaya, meningkatkan teknologi distribusi hidrogen hemat biaya atau mengatasi isu terkait keamanan (safety) hidrogen dan RCS (regulations, codes and standards).

Untuk mempersiapkan Indonesia memasuki Indonesia Emas pada tahun 2045, Indonesia harus mengoptimalkan keberadaan warga negara usia produktif (15~64 tahun) dengan mengajak mereka terlibat dalam inovasi, salah satunya inovasi dalam bidang energi berbasis hidrogen. Pengembangan energi berbasis hidrogen di Indonesia bukan untuk mengikuti zeitgeist (arus zaman), tetapi sebagai sebuah usaha untuk pengembangan energi alternatif yang bersih dan hemat biaya. Sebuah pepatah Afrika berkata: "If you want to run fast, run alone. If you want to run far, run together". Untuk melakukan inovasi yang berkelanjutan, dibutuhkan kolaborasi yang kuat antara industri, badan penelitian, akademia (universitas), dan pemerintah (sebagai pembuat kebijakan).

Makalah ini akan memberikan beberapa contoh upaya R&D Air Liquide dalam melakukan inovasi berkelanjutan untuk menjawab tantangan di seluruh rantai pasokan hidrogen melalui kolaborasi dengan badan penelitian, akademia, dan pemerintah.



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Abstract

Session 2.2



Forum Ilmiah Diaspora Indonesia

Irwan Lipto Simanullang

Kyushu University, Japan

Pengembangan Reaktor Nuklir Generasi IV Skala Kecil berbasis High-Temperature Gas-Cooled Reactor (HTGR)

Pembangkit listrik dari energi nuklir merupakan salah satu jenis pembangkit listrik yang berperan sebagai baseload yang tidak menghasilkan gas emisi CO₂. Oleh karena itu, pemanfaatan energi nuklir menjadi salah satu kunci dalam terwujudnya net-zero emission di tahun 2060. Disisi lain, pengembangan energi nuklir dengan daya besar (diatas 1000 MW) mengalami hambatan dari segi biaya (capital cost) dan waktu pembangunan. Karenanya, kecenderungan pengembangan energi nuklir saat ini mengarah kepada energi nuklir berdaya kecil-menengah atau yang dikenal dengan small modular reactors (SMRs). Generation IV International Forum (GIF) yang merupakan forum internasional dalam pengembangan advanced nuclear reactor bekerjasama dengan berbagai pihak terkait dalam mendesain reaktor nuklir generasi IV berskala SMRs. High-Temperature Gas-Cooled Reactors (HTGRs) adalah salah satu tipe reaktor nuklir generasi IV yang paling potensial untuk dikembangkan secara komersial. Salah satu keunggulan HTGR adalah kemampuannya dalam menghasilkan uap panas bersuhu tinggi hingga 1.000 °C. Saat ini Jepang telah mengoperasikan reaktor HTTR yang merupakan reaktor riset bertipe HTGR dengan tujuan utamanya memanfaatkan uap panas dari reaktor nuklir untuk memproduksi hidrogen. HTTR yang beroperasi saat ini didesain dengan tujuan utama agar mampu menghasilkan uap panas dengan suhu maksimum sebesar 950 °C agar dapat dimanfaatkan untuk produksi hidrogen. Akan tetapi, desain reaktor ini masih cukup kompleks terutama dalam penyusunan komposisi bahan bakar di dalam reaktor. Kompleksitas susunan bahan bakar ini bertujuan agar temperatur di dalam reaktor tidak melebihi ambang batas aman yaitu 1.200 °C. Dengan komposisi bahan bakar yang telah dioptimalkan tersebut, nilai maksimal burnup yang dihasilkan sebesar 33 GWd/t. Penelitian kami mengenai HTGR di Department of Applied Physics and Nuclear Engineering, Kyushu University fokus dalam mendesain HTGR berskala SMRs dari sisi neutronic dan keamanan (safety) agar mampu menghasilkan nilai burnup tinggi hingga 100 GWd/t sehingga penggunaan bahan bakar lebih optimal dan mampu beroperasi dalam jangka waktu yang lama tanpa perlu melakukan penggantian bahan bakar.

Angga Hermawan

Badan Riset dan Inovasi Nasional (BRIN), Indonesia

High Energy Density Asymmetric Supercapacitors Enabled by La-induced Defective MnO₂ and Biomass-derived Activated Carbon

This study reports a high energy density asymmetric supercapacitor enabled by La-induced defective MnO₂ and biomass-derived activated carbon. Our findings reveal that the incorporation of La ions enhances the conductivity of α -MnO₂, resulting from a significant increase in lattice defects that provide a greater redox active surface area. In the three-electrode system, the synthesized La-doped MnO₂ and activated carbon from empty palm bunches (AC-EPB) achieved a maximum capacity of 202 F g⁻¹ and 178 F g⁻¹ at 0.5 A g⁻¹, respectively. In the assembled La_{0.2}Mn_{0.8}O₂ //AC-EPB asymmetric supercapacitor, we achieved an outstanding energy density of 32.8 Wh Kg⁻¹ at a power density of 4500 Wh Kg⁻¹ while maintaining 97.2% of initial capacity after 5,000 cycles. This research provides new insights into the preparation of defective pseudocapacitive materials by rare-earth metal for energy storage applications.



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Abstract

Session 2.2



Forum Ilmiah Diaspora Indonesia

Boni Sena

Universitas Singaperbangsa, Karawang, Indonesia

Enhancing Energy Efficiency in Freezers Using Dry Ice Gel-Based Phase Change Materials: A Step towards Sustainable Household Electricity Consumption

The increasing population growth in cities is causing environmental detriments, including global warming and ozone depletion. Moreover, the demand for electrical energy in Indonesia is rapidly rising, leading to a yearly increase of approximately 1.3% in carbon dioxide gas emissions, further exacerbating environmental damage. The household sector accounts for higher electricity usage compared to industry and transportation, with projected increases from 49% in 2018 to 58% in the BAU scenario and 61% in the RK scenario by 2050. Cooling equipment, such as air conditioners, refrigerators, and freezers, is the primary contributor to high household energy consumption. This study proposes a method to enhance the energy efficiency of freezers by utilizing phase change materials, specifically dry ice gel. While previous studies focused on the impact of the position of phase change materials on freezer wall temperature, this research introduces a detailed methodology of measurement and examines the influence of dry ice gel-based phase change material on wall temperature variance using descriptive statistical analysis. The wall temperature of the freezer was measured using T-type thermocouples and the ADAM 6018+ data logger. The results demonstrate that the sensor thermocouples were verified against calibrated thermometers, yielding an R2 value of 0.99. By incorporating dry ice gel-based phase change material, the freezer maintained a temperature within the range of 1-2°C during 4, 6, and 8 hours of non-operation. These findings contribute to the exploration of various phase change materials and their combinations, aiding in the improvement of freezer efficiency. Future studies will extend this investigation to encompass different types of phase change materials to enhance the energy efficiency of not only freezers but also other cooling equipment like air conditioners and refrigerators.

Muhammad Aziz

The University of Tokyo, Japan

Carbon-Free Energy Systems Toward the Realization of Zero Carbon Society in Indonesia

Energy transition toward the creation of sustainable and clean energy systems is currently performed by every country in the world. Energy sustainability includes three main pillars of energy security, energy equity, and environmental sustainability. Energy security deals strongly with the capacity and capability to provide the required energy in terms of quantity and quality. Moreover, energy equity is expected to broaden the opportunity to mutually participate, including economic aspect, to all the stakeholders. Finally, the environmental sustainability covers the highly-balanced and maintained environmental conditions, including air, water, soil, and food. This kind of clean and sustainable energy systems are constructed by several technologies, including decarbonization, mutual utilization of non-carbon based fuels, big data, forecasting, communication, smart grid, and open market. In addition, a broad adoption of digital twin technology is believed to be able to efficiently integrate, accurately predict, and visualize the whole energy systems, accelerating the realization of clean and sustainable energy systems.



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Abstract

Session 2.2



Forum Ilmiah Diaspora Indonesia

Fatwa Firdaus Abdi

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Photoelectrochemical Green Hydrogen Production

The generation of green hydrogen using sunlight offers a carbon-neutral route to meet the ever-increasing world's energy needs. In recent years, significant progress has been reported, especially in photoelectrochemical water splitting, but two major challenges remain. First, although solar-to-hydrogen (STH) efficiency as high as 30% has been demonstrated, the use of expensive and non-scalable III-V semiconductors is required. On the other hand, low-cost metal-oxide based devices, using mainly BiVO₄ as the absorber, have only achieved STH efficiency of less than 10%, due to the limited absorption of BiVO₄. Novel metal oxide semiconductors with a more favorable bandgap, which are stable and efficient, are therefore desired. The second challenge is related to the scale-up of the devices, from laboratory experiments to large-area device demonstrations. Several efforts exist, but the performance of the large-area devices is still significantly smaller (up to a factor of 5) as compared to the small-area equivalent. In this talk, the principle of solar water splitting devices to generate green hydrogen, both from the material requirements and the device architecture's point-of-view will be elaborated, and our research efforts in developing novel low-cost metal oxide photoelectrodes and mitigating scale-up related losses in solar water splitting devices will be presented. Based on these findings, a novel concept that would allow moderately performing oxide-based devices to be energetically and economically competitive will be presented. Finally, the prospects of photoelectrochemical hydrogen production in Indonesia will be discussed.

Shibghatullah Muhammady

The Institute for Solid State Physics, The University of Tokyo, Japan

Insights from Defects in Zirconia-Based Cathodes in Fuel Cells for Sustainable Energy Solutions

Proton exchange membrane fuel cells (PEMFCs) are promising energy conversion devices for hydrogen-based applications. The oxygen reduction reaction (ORR) at the cathode is a key step, typically facilitated by expensive and limited Pt-based catalysts. To overcome these limitations, low-cost and efficient ORR catalysts, such as zirconia, are sought. Zirconia-based catalysts can achieve stability in acidic environments and be optimized through heat treatment and oxygen control. Defects, such as oxygen vacancies and nitrogen doping, play a crucial role in modifying the ORR catalytic activity. However, the specific roles of these defects in zirconia-based catalysts remain unclear. We employed density functional theory to investigate the ORR mechanisms on the tetragonal zirconia (101) surface and the influence of the defects. We aim to understand the impact of defects on the ORR catalytic activity and explore deviations from "universal scaling" observed in various catalysts. Surprisingly, defects play a minor role in enhancing the ORR activity, with energy barriers comparable to the pristine surface. However, an increase in the ORR current suggests alternative factors at play. The findings contribute to the development of efficient and cost-effective catalysts for PEMFCs. Aligned with the theme "Pathways to 2045: Uniting Indonesian Scientific Excellence for a Developed and Sustainable Nation," the insights from this research are expected to contribute to Indonesia's pursuit of sustainable energy solutions, offering guidance for the design of efficient and cost-effective electrocatalysts crucial for achieving sustainable and commercially viable proton exchange membrane fuel cells.



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Abstract

Session 2.2



Triyono Basuki

Badan Riset dan Inovasi Nasional (BRIN), Indonesia

Formation of Iron Oxide/Iron Rich Nanoparticle with Superior Catalytic Activity for Visible Light Assisted Fenton Reaction Induced by Organic Acid Addition in Hydrothermal Synthesis

Advanced oxidation processes are among the technologies for degradation of pollutants especially toxic and non-biodegradable organic pollutants such as dyes and spent resin. Visible light assisted Fenton reaction is one of the preferred reactions for producing highly reactive hydroxyl radical for oxidation of the pollutant. Inexpensive and non-toxic iron oxide is a very well-known catalyst for facilitating photo Fenton reaction.

Research on iron oxide nanoparticle synthesis has been robustly developed since some decades ago with the main objective to increase the catalytic activity by modifying the physicochemical properties through variation of synthesis procedure, substitution of iron with other transition metals etc. The solvent, nucleating agent, and stabilizer have been reported to affect the size and phase of iron oxide nanoparticle produced by hydrothermal synthesis method. The beneficial effect of organic acid such as citric acid has been reported to enhance the Fenton reaction by zero valent iron. In our study, the acetic acid, citric acid and EDTA addition for producing iron oxide with NH_4HCO_3 as nucleating agent produced iron oxide nanoparticle with different phase namely Akaganeite ($\beta\text{-FeOOH,Cl}$), Lepidocrocite ($\gamma\text{-FeOOH}$) and Goethite ($\alpha\text{-FeOOH}$), respectively. The particle size of the produced iron oxide is much different between these three procedures, acetic acid addition produced $\beta\text{-FeOOH,Cl}$ with particle size around 50~100 nm, citric acid addition produced $\gamma\text{-FeOOH}$ with size particle less than 5 nm and EDTA addition produced $\alpha\text{-FeOOH}$ with size particle around less than 50 nm. The coexistence of minor iron rich particles with iron oxide was observed in the case of $\gamma\text{-FeOOH}$ and $\alpha\text{-FeOOH}$. Iron rich/ Goethite composite has three times faster catalytic activity (K_{app} : 0.026 min^{-1}) for degradation of methylene blue than that of Akaganeite (K_{app} : 0.008 min^{-1}), Iron rich/Lepidocrocite composite catalytic activity (K_{app} : 0.22 min^{-1}) was ten times faster than that of Goethite. The superior catalytic activity of Iron rich/lepidocrocite composite was dominantly contributed by photo assisted Fenton reaction facilitated by ultra nano $\gamma\text{-FeOOH}$. The citric acid probably functioned to stabilize the iron oxide nanoparticle and to form iron citrate complex that was involved in the production of hydroxyl radical. Fenton reaction facilitated by iron rich particle slightly contributed to the increase in the reaction rate.



Abstract

Session 3.1



Ajeng Kusumaningtyas Pramono

Gifu University, Japan

Potensi Riset Bakteriofag di Indonesia

Riset bakteriofag di Indonesia menawarkan potensi yang menjanjikan dalam mengatasi berbagai masalah yang disebabkan oleh bakteri patogen, termasuk resistensi terhadap antimikroba. Bakteriofag, virus yang khusus menginfeksi bakteri, telah lama digunakan dalam bidang kedokteran di negara-negara Eropa Timur selama satu abad terakhir. Selama sepuluh tahun terakhir ini minat terhadap riset bakteriofag juga semakin meningkat di negara-negara Barat.

Presentasi ini akan membahas potensi dan tantangan dalam riset bakteriofag di Indonesia di berbagai bidang. Melalui pemahaman yang lebih mendalam tentang riset bakteriofag, Indonesia dapat meningkatkan aktivitas penelitian dalam bidang ini dan sejajar dengan negara-negara lain yang telah mengambil langkah maju dalam penerapan bakteriofag dalam praktik medis dan industri.

Youdiil Ophinni

Kobe University, Japan

Eradicating HIV/AIDS Through Gene Editing

The innovation of CRISPR-Cas9 has single-handedly revolutionized biotechnology by enabling efficient and specific cutting of DNA. CRISPR-Cas9 approaches are promising to target not only the human genome but also the DNA of pathogenic viruses, which coincidentally is the canonical function in its bacterial origin. A myriad of studies in the past decade has proven the efficacy of CRISPR-Cas9 treatment to cleave viral DNA intermediates in vitro. One of the most widely targeted is the proviral genome of human immunodeficiency virus type-1 (HIV-1). The disease burden of HIV-1 is massive—the infection is incurable and has remained a pandemic for over four decades. Integrated HIV-1 provirus inside the human genome causes viral persistence inside latent cellular reservoirs, eluding antiretroviral therapy (ART) and sterilizing cure. Specific targeting and disruption of the HIV-1 proviral genome are necessary to achieve viral clearance, which can be achieved with CRISPR-Cas9. Here, we review the features and up-to-date evidence of CRISPR-Cas9 to target the HIV-1 proviral genome and suppress viral replication. We will also discuss potential CRISPR/Cas9 delivery methods in vivo, in combination with other gene editing modalities and other therapeutic approaches, to bring gene editing-based HIV-1 cure closer into clinical use.



Abstract

Session 3.1



Novalia Pishesha

Harvard Medical School, Boston Children's Hospital, USA

Exploiting Antigen Presentation Pathways for Precision Immune Engineering

Current treatments for autoimmunity rely on general immunosuppression, which exposes patients to opportunistic infections. Hence, immunoregulatory modalities, which educate the immune system to induce antigen-specific tolerance are desirable. My doctoral research revolved around engineered red blood cells (RBCs) to treat preclinical models of autoimmune diseases by hijacking the tolerogenic RBC clearance pathways. As a postdoctoral fellow, I worked on an alpaca-derived single domain antibody fragment (nanobody)-based platform. I have engineered these nanobodies to efficiently target antigen presenting cells and transmit either tolerogenic or vaccinal signal to antigen-specific immune cells. I showed that a single dose of a VHH that recognizes major histocompatibility complex class II/MHCII (VHH MHCII), conjugated to a myelin peptide and an anti-inflammatory corticosteroid, i.e., dexamethasone (VHH MHCII-MOG-DEX), affords lasting protection in a mouse model of multiple sclerosis (MS). A single dose of VHH MHCII-MOG-DEX also reverses paralysis in mice without compromising the capacity of the immune system to fight pathogens. I further developed this technology for treating type 1 diabetes and as a SARS-CoV-2 vaccine. My independent group at the Division of Immunology, Boston Children's Hospital/Harvard Medical School (opening 1 January 2024) will aspire to produce novel treatments for autoimmune and infectious diseases.



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Abstract

Session 3.1



Muhammad Iqhrammullah

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Role of Lowered Level of Serum Vitamin D on Diabetic Foot Ulcer and Its Possible Pathomechanism: A Systematic Review, Meta-Analysis, and Meta-Regression

Background: Diabetic foot ulcer (DFU) is responsible for multiple cases of lower extremity amputation among diabetic patients. Many studies have suggested the possible inverse correlation between DFU development and serum vitamin D (SVD) level.

Objective: To investigate the association between SVD level and DFU development and to emphasize the involved pathomechanism.

Methods: A digital search was performed on 8 major databases and 4 preprint databases using pre-planned keyword combinations for literature published until 10 March 2023. The protocol has been registered on PROSPERO (CRD42023415744). Original research papers reporting the SVD level of DFU and non-DFU patients were included. The selection for the included records followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Meta-analyses using random effect were performed and the data were presented as standardized mean difference (SMD) and 95% confidence interval (CI). The value of I^2 was used as the heterogeneity parameter. Meta-regression was performed to identify factors contributing to the heterogeneity in the pooled analysis.

Results: Twenty-one studies were included in the meta-analysis with a total number of patients reaching 9,570 ($n=2,592$ and 6978 for DFU and non-DFU groups, respectively). Of which, as many as 18 studies were included in the meta-analysis. It was revealed that the SDV level is significantly lower in DFU group ($p\text{-total}=0.0037$; $SMD=-1.2758$; $[95\% \text{ CI: } -2.0786 \text{ to } -0.4730]$). The heterogeneity was considerably high with $I^2 = 99.27\%$. Based on the meta-regression, age, study location (based on the continent), and total cholesterol level were the associated factor for the heterogeneity ($p < 0.01$). In the pooled analysis, inflammatory markers such as serum levels of CRP ($n=4$), ESR ($n=3$), IL-6 ($n=3$), and IL-8 ($n=2$) were found significantly higher in DFU group at $p < 0.01$.

Conclusion: Lowered SVD level is associated with DFU, where the pathomechanism for this relationship might involve inflammation and infection susceptibility.



Abstract

Session 3.1



Febrimarsa

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Randomly Incorporated Genomic N6-Methyldeoxyadenosine Delays Zygotic Transcription Initiation in A Cnidarian

N6-methyldeoxyadenosine (6mA) is a chemical alteration of DNA, observed across all realms of life. Although the functions of 6mA are well understood in bacteria and protists, its roles in animal genomes have been controversial. We show that 6mA randomly accumulates in early embryos of the cnidarian *Hydractinia symbiolongicarpus*, with a peak at the 16-cell stage followed by clearance to background levels two cell cycles later, at the 64-cell stage—the embryonic stage at which zygotic genome activation occurs in this animal. Knocking down *Alkbh1*, a putative initiator of animal 6mA clearance, resulted in higher levels of 6mA at the 64-cell stage and a delay in the initiation of zygotic transcription. Our data are consistent with 6mA originating from recycled nucleotides of degraded m6A-marked maternal RNA postfertilization. Therefore, while 6mA does not function as an epigenetic mark in *Hydractinia*, its random incorporation into the early embryonic genome inhibits transcription. In turn, *Alkbh1* functions as a genomic 6mA “cleaner,” facilitating timely zygotic genome activation. Given the random nature of genomic 6mA accumulation and its ability to interfere with gene expression, defects in 6mA clearance may represent a hitherto unknown cause of various pathologies.

Akhirta Atikana

Pusat Riset Mikrobiologi Terapan, BRIN, Indonesia

Uncovering the Potential of Marine Actinobacteria from Indonesia as Producers of Bioactive Compounds

Marine microorganisms, especially the phylum Actinobacteria, have been reported as the most promising producers of many bioactive substances. Their reported bioactivity including antibacterial and anticancer, as well as antimalarial and antifungal. Present study aiming to investigate the potential of marine actinobacteria from Indonesia as producers of bioactive compounds. The study isolated actinobacteria from Indonesian marine environments, including sea sediments, seawater, as well as marine sponges. A total of 117 Actinobacteria were isolated in this study, mostly derived from the sea sediment. Majority of the isolates were identified as *Streptomyces* and *Micromonospora*. Further bioactivity screening showed 17 of Actinobacterial strain are able to inhibit the growth of at least one indicator strain, including Gram-positive, Gram-negative, and/or yeast/fungi. The study contributes to the development of marine Actinobacteria from Indonesia as potential producers of antibacterial and/or antifungal.



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Abstract

Session 3.1



Forum Ilmiah Diaspora Indonesia

Rodhiansyah Djayasinga

Poltekkes Kemenkes Tanjungkarang, Indonesia

Synthesis and Characterization of Ca(OH)₂ Nanoparticles Made from Purebred Chicken Eggshell Waste as Antibacterial Escherichia coli and Staphylococcus aureus through Photocatalytic Technique: Invitro

Research on calcium hydroxide (Ca(OH)₂) nanoparticles has been carried out by utilizing purebred chicken eggshell waste. to find antibacterial Staphylococcus aureus and Escherichia coli has been widely developed given the alarming level of drug resistance. Researchers have conducted various experiments both in vitro and in vivo to obtain antibacterial substitutes with abundant and easily available raw material sources. This research aims to obtain nanoparticle materials that are semiconductor in nature from purebred chicken eggshell waste that can function as an antibacterial. The waste treatment is carried out with a top-down technique which then applies the thermal decomposition method through 2 process stages with a calcining temperature of 600 °C and 900 °C an increase of 5 °C/minute, each of which is maintained for 10 hours. XRD analysis shows the crystalline phase of Ca(OH)₂ at the peaks 2θ 17.82, 28.54, 33.92; Al₂Ca₂H₁₃Mg_{0.5}O₂₀P₃ 27.60, 30.56, 34,34; CaO 32.04, 37.22, 53.78, Ca₁₀(PO₄)₆(OH)₂ 10.56, 34.06, 46.72; Ca₃(PO₄)₂ 21.80, 31.00, 34,34; CuH₅O₅P 17.82, 28.54, 33.92. The highest percentage of crystal phase gain is Ca(OH)₂ 57.25%. The average size of the crystal phase obtained is 19.04 nm. FTIR analysis indicates the O-H group is derived from the compound Ca(OH)₂ at wavenumber 3638 cm⁻¹, O-C-O bonds of carbonates are indicated at wavenumbers 1462 cm⁻¹. Wavenumber 872.2 cm⁻¹ stretching indicates the presence of a bond Ca-O. SEM analysis showed a coarse, multiplied particle surface with a pore percentage of 58.91%. DRS-UV analysis informed that chicken eggshell powder has a characteristic energy band gap of 6.06 eV. Activation of purebred chicken eggshell powder as antibacterial has been carried out qualitatively and quantitatively using photocatalytic techniques utilizing sunlight and nonphotocatalytic. Qualitatively, both samples of calcined purebred chicken eggshell powder were able to function as antibacterial and quantitatively obtained levels of 1000 μL (w/v).



Abstract

Session 3.2



Muhammad Salman Al Farisi

Hiroshima City University, Japan

Micro-electro Mechanical Systems for Biomedical Mechatronics

Micro-electro mechanical systems (MEMS) technology was originally derived from the semiconductor technology. It has enabled the miniaturization of various transducers which bridge the cyber and physical environments. One of its important applications is in the biomedical field. For instance, various sensors have been embedded to monitor our health as wearables. Meanwhile, present medical tools that enabled in vivo measurements and non-invasive treatments have also employed MEMS transducers at their cores. These also include those for the pulmonary system, which is recently under scrutiny amid the outbreak of COVID infection. There is also a long ongoing discussion about the pulmonary system due to the fact that 2 of the leading causes of deaths being originated from there, namely lung cancer and chronic obstructive pulmonary disease (COPD). In this talk, I will introduce the recent development of MEMS for medical applications in our group. The talk will focus on the pulmonary system analysis, including the following: (1) Development of MEMS airflow rate sensor for simultaneous respiration and heartbeat monitoring; (2) Quantitative calibration method for wearable sensors; and (3) In-vivo on-site measurement of lung function.



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Session 3.2



Andi Saptono

University of Pittsburgh, USA

Peluang AI untuk Kesehatan dan Rehabilitasi dengan Menggunakan Teknologi Mobile (mHealth)

Kemajuan teknologi komputasi membuka peluang penggunaan strategi pengolahan data kompleks di berbagai bidang. Algoritma yang membutuhkan kemampuan komputasi berat seperti intelegensi buatan (Artificial Intelligence - AI) dapat dijalankan di atas perangkat komputasi modern dengan biaya yang dapat dijangkau oleh organisasi publik. Hal ini membuka peluang penggunaan AI dalam bidang kesehatan dan rehabilitasi. Dengan makin banyaknya data kesehatan yang tersentralisasi di Indonesia, AI dapat menjadi solusi teknologi digital yang dapat membantu berbagai pihak yang berkepentingan di kesehatan. AI dapat membantu memilah data imaging/radiologi, mensintesis dan menggambarkan data rekam medis digital, bahkan dengan menggunakan model bahasa besar (Large Language Model – LLM), dapat juga mendukung dan membantu pasien dan keluarga pasien dalam menangani kondisi kesehatan yang mereka miliki.

Presentasi ini bertujuan untuk memaparkan penelitian penggunaan AI untuk kesehatan di US oleh peneliti diaspora Indonesia di University of Pittsburgh, US. Berkolaborasi dengan pakar dan praktisi kesehatan, peneliti diaspora Indonesia di University of Pittsburgh membangun infrastruktur teknologi kesehatan digital dengan menggunakan teknologi komputasi mobile, piranti elektronik yang dapat dipakai, teknologi seluler, dan teknologi intelegensi buatan untuk menangani berbagai kasus kesehatan kronis dan disabilitas. Tiga solusi kesehatan digital akan disorot dalam presentasi ini adalah: solusi untuk mendukung individual yang memiliki disabilitas di otak/tulang punggung beserta keluarga/pengasuh mereka, solusi untuk membantu individual yang memiliki gangguan tidur/PTSD, dan solusi untuk membantu anak yang memiliki gangguan interaksi sosial. Presentasi ini juga akan mendiskusikan penelitian terkini yang dilakukan oleh peneliti diaspora Indonesia dalam mencari peluang integrasi penggunaan Bahasa Indonesia di rehabilitasi, seperti untuk membantu pengasuh anak dengan down syndrome.

Melalui presentasi ini diharapkan agar:

- 1) peserta melihat penggunaan teknologi komputasi untuk kesehatan dan rehabilitasi;
- 2) peserta mendengar solusi praktis implementasi teknologi komputasi untuk individual yang memiliki disabilitas, baik anak maupun dewasa, beserta pengasuh dan keluarga mereka; dan
- 3) peserta melihat peluang masa depan penggabungan AI di konteks kesehatan Indonesia.



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Session 3.2



Forum Ilmiah Diaspora Indonesia

Jekson Robertlee

RIKEN Center for Sustainable Resource Science (CSRS), Japan

Harnessing Molecular Components to Build a Synthetic Regulatory Circuit: A Platform for a Smart Metabolic Reprogramming

In electronics, arrangements of silicon components work as logic gate circuits to process the signals and allow them to function. The same concepts have long been used in organisms since the beginning of life. Organisms maintain metabolisms through a chain of complex biochemical reactions processed by molecular components such as genes and protein networks. Therefore, a clear understanding of how organisms respond to endogenous and exogenous signals at the molecular level is needed to shed our ways to finetune them to our needs. In this talk, I would like to share my experience looking for clues to identify and develop the molecular components to act differently for biotechnology purposes. I will discuss my previous research in elucidating the regulation mechanism of the key-regulatory enzyme of a metabolic pathway in the plant. Then how to exemplify the knowledge to aid a gene finding that produces rare compounds from a medicinal plant. And strategies to produce a high-value compound in a heterologous host. I will also discuss my recent research on developing a novel synthetic regulatory circuit in plants, which acts as an additional molecular tool for plant science in the era of synthetic biology. By carefully designing the synthetic regulatory circuit, we can reprogram biological functions, which brings us closer to achieving sustainability by design.

Ardiani Putri Rahayu

Universitas Airlangga, Indonesia

Study of the Effect of Residue Content in Catfish on Stunting Cases in Pasuruan, East Java

Catfish is a fishery resource that has a high nutritional content and is economical. In general, 100 g of catfish contains 18 g of protein, 2.9 g of fat, 105 kCal of calories, 50 mg of sodium, 121% of the daily requirement of vitamin B12, 26% of the daily requirement of selenium, 24% of the daily requirement of phosphorus and 15% of the daily requirement of thiamine. The fish content's function will change when it contains fish drug residues, chemicals, contaminants, or their metabolites. The presence of these residues when consumed by toddlers 0-4 years can lead to malnutrition, one of which causes stunting. Stunting cases in Pasuruan reached 12,719 out of 70,267 children. The aim of this study was to examine the effect of residues in catfish on stunting cases in Pasuruan. The research method used is descriptive qualitative. The data were taken from monitoring data for quality assurance of aquaculture safety obtained from the East Java Province Fisheries Service and population data aged 0-4 years from the East Java Provincial Health Office, then questionnaires and interviews were carried out with purposive sampling. The population is taken from parents with toddlers aged 0-4 years who live in coastal areas, ponds, and other fresh waters. Based on the results of monitoring research on the safety quality assurance of catfish aquaculture in Pasuruan, it showed that catfish contained positive residues, one of which was oxytetracycline. These residues can come from the use of inaccurate doses of fish medicine, contaminants, and existing metabolites. The existence of residual content in catfish needs to be considered by mothers who have toddlers aged 0-4 years and the Regional Health Service so that consumption of catfish is free from residue content. This is because the residual content in fish can cause neurological disorders in toddlers.



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Session 3.2



Davin H. E. Setiamarga

National Institute of Technology, Wakayama College, Gobo City, Wakayama, Japan

Natural History Research on Biodiversity Using Molecular Biology and Multiomics Approaches

The natural history as a scientific field to catalogue and understand biodiversity dates back to the dawn of human civilization. Such a long history has helped humans to accumulate a vast amount of samples and data of biodiversity. Recent rapid developments in molecular biology, biotechnology, and genomics have provided various tools that can be employed in biodiversity research. This development thus offers the potential for utilizing an enormous amount of natural history samples and data, making a comprehensive study on biodiversity feasible. Only when we have a systematic, comprehensive, and correct understanding of the natural history aspect of biodiversity, we will be able to use the obtained insights and information for direct applications beneficial to humans. Here, I will explore the interconnection between biodiversity research and natural history studies. I will also delve into how molecular and multiomics methods can address several limitations and challenges in biodiversity research. Additionally, I will emphasize the significance of conventional natural history research methods in advancing our knowledge of biodiversity. While discussing the integration of novel biomolecular methods into biodiversity studies and natural history research, I will address some of the challenges faced when implementing these "trendy" approaches. Moreover, I will propose potential solutions to overcome these hindrances. To illustrate these concepts, I will present ongoing research projects in my lab that have received extramural fundings. Furthermore, I will offer insights into the future directions of the field, focusing on the prospects and necessities of initiating such research in, and for, Indonesia.

Nuruliarizki Shinta Pandupuspitasari

Universitas Diponegoro, Indonesia

Animal, Plant and soil microbiomes: An unexplored source for tackling global warming

Food security and environmental safety are the major problems of today's world and several countries are badly affected by the effects of global warming. It is a dire need to make projects which can target both the problems at once. There is an interesting cross talks among the animal and plant microbiomes and their balance affect the overall carbon footprints. It has been shown that certain microbiota can help reduce methane emissions from ruminants such as dairy cows. Similarly there are means to mitigate methane emissions in paddy fields by appropriate soil microbiomes. The multipronged approach to identify microbiomes of animals and application of omics technology, animals, plants and soil integrative microbiome analysis can bring out interesting candidates that can be used in feed or fertilizers to address global warming and food security issues, while maintaining healthier environment. We can develop two organic products; microbiota directed feed and microbiota directed fertilizer. The objective of the study is to reveal diversity, abundance and functional relevance of the microbiomes and their application towards cleaner production and environment. Furthermore, a more clear image of microbiome directed feed, fertilizer and host axis will be determined for a safer application.



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Forum Ilmiah Diaspora Indonesia

Feerzet Achmad

Institut Teknologi Sumatera, Indonesia

Utilization of Kaffir Lime Extract as A Natural Coagulant and its Effect on The Characteristics of IRR 118 Clone Rubber

Natural rubber is a plantation commodity that has a significant role in the country's economy. This study aims to determine the effect of the natural coagulant extract of kaffir lime with centrifugation and non-centrifugation treatment on the coagulation process, pH and coagulation time, characteristics of rubber clone IRR 118 and comparison of the quality of rubber with 2% formic acid chemical coagulant. The volume of coagulant used was 75 mL mixed with 150 mL of latex, so that coagulation occurred and produced coagulum. Then the resulting coagulum is analyzed for the characteristics of the rubber to determine the quality of the rubber. Characteristic analysis carried out was Dry Rubber Content (DRC), Initial Plasticity (Po), Plasticity Retention Index (PRI), Mooney Viscosity, ash content, impurities content, volatile matter content, and nitrogen content. The results showed that the natural coagulant extract of kaffir lime could coagulate latex, lowering the pH of latex thereby speeding up coagulation time. From the rubber characteristic test using kaffir lime natural coagulant it complies with SNI 06-1903-2017 SIR 20. The quality of rubber produced from using kaffir lime natural coagulant extract as a coagulant can equate the quality of rubber produced by using 2% formic acid chemical coagulant, but coagulant The natural ingredients used have drawbacks, namely the availability of seasonal fruit, and the need for treatment before being used as a coagulant.

Rusfidra

Universitas Andalas, Indonesia

Evaluasi Kualitas Semen Sebagai Dasar Seleksi Pejantan Ayam Kokok Balenggek

Ayam Kokok Balenggek (AKB) adalah ayam Lokal penyanyi dan merupakan sumber daya genetik yang telah ditetapkan sebagai salah satu rumpun ternak unggas nasional. Nilai ekonomi AKB sangat tergantung pada jumlah lenggek kokok. Semakin banyak jumlah lenggek kokok, maka semakin mahal nilai jual AKB. Penelitian ini bertujuan untuk mengevaluasi kualitas spermatozoa ayam AKB pada jumlah lenggek kokok berbeda. Materi yang digunakan dalam penelitian ini adalah semen yang ditampung dari 8 ekor AKB yang dikelompokkan atas dua jumlah lenggek kokok, yang terdiri dari 4 ekor AKB Landik (lenggek kokok 2 - 4) dan 4 ekor AKB Boko (lenggek kokok 5 - 7) dengan 4 kali ulangan. Frekuensi pengambilan semen dilakukan dua kali dalam seminggu selama dua minggu. Data dianalisis menggunakan uji statistik parametrik atau uji-t independent sampel test untuk uji banding kualitas spermatozoa pada berbagai jumlah lenggek kokok. Hasil penelitian menunjukkan bahwa karakteristik semen AKB Landik adalah semen berwarna putih susu, bau spesifik, konsistensi encer sampai kental, volume $0,12 \pm 0,06$ ml, pH $7,38 \pm 0,50$, gerakan massa ++ dan +++, konsentrasi 2,49 milyar sel/ml, dan motilitas $68,75 \pm 6,19\%$. Karakteristik semen AKB Boko adalah semen berwarna putih susu, bau spesifik, konsistensi kental, volume $0,15 \pm 0,05$ ml, pH $7,25 \pm 0,45$, gerakan massa +++, konsentrasi 3,73 milyar sel/ml, dan motilitas $73,75 \pm 6,19\%$. Dari hasil penelitian ini dapat disimpulkan bahwa konsentrasi dan motilitas AKB Boko lebih tinggi dari pada AKB Landik. Semakin tinggi jumlah lenggek kokok, maka semakin tinggi konsentrasi dan volumen semen. Oleh karena itu, disarankan penggunaan pejantan dalam perkawinan AKB, sebaiknya menggunakan pejantan yang banyak jumlah lenggek kokoknya.



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Evelyne Laura Lasmauli

IPB University, Indonesia

Molecular Approach for Identification of *Spodoptera frugiperda* Strain in Indonesia using COI (Cytochrome c oxidase Subunit I), and Tpi (Triosephosphate Isomerase)

Fall armyworm, *Spodoptera frugiperda* (JE Smith) (Lepidoptera: Noctuidae), can cause severe damage to maize, rice, and 80 other plant species. This pest attacks all stages of plant growth, causing production failure. Early symptoms of this pest attack are the presence of larvae and coarse powder resembling sawdust on the upper surface of the leaves or around the shoots of plants. *Spodoptera frugiperda* is an invasive pest that is well adapted and capable of long flight. This study aims to determine the strains of *S. frugiperda* from several regions in Indonesia with a molecular approach, namely by analysis of the COI (Cytochrome c Oxidase Subunit I) and Tpi (Triosephosphate isomerase) genes. Insect samples used in this study were taken from several regions in Indonesia such as the City of Padang, Jambi, Bogor, Pinrang, Purwokerto, Tegal, Pontianak, and Morotai Regency. Homology analysis of COIA, COIB and Tpi genes was carried out using the BLAST application in the NCBI (National Center for Biotechnology Information) program, while phylogenetic analysis was carried out using the Mega X. *Spodoptera frugiperda* application from several cities of Jambi, Bogor, Pinrang, Purwokerto, Tegal, Pontianak, and Morotai Regency is an R strain and from Padang City is a C strain according to the COIA gene analysis. The results of the phylogenetic analysis showed that *S. frugiperda* from Jambi, Bogor, Pinrang, Purwokerto, Tegal, Pontianak, and Morotai Regencies were closely related to *S. frugiperda* from China, Nepal, Florida and France. Based on the results of the COIB gene analysis from all locations, the results of the R-strain were obtained. The results of the Tpi gene analysis from several locations obtained the C-strain. Strain identification research is useful in determining control strategies for *S. frugiperda*



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Bambang Trigunaryah

RMIT University, Australia

Research Collaboration for Better Infrastructure Project Development

Delivering infrastructure projects involves many stakeholders. Their responsibilities and authorities vary over the course of the project lifecycle - from establishing the project parameters and performance requirements, to operating and maintaining the completed infrastructure. To ensure the successful delivery of infrastructure projects, it is important to identify and manage the stakeholders and their requirements. Research focusing in infrastructure project delivery and asset management would improve understanding on the factors affecting successful delivery and managing infrastructure asset. This could be done through research collaboration between Indonesian Diaspora, e.g in Australia (RMIT University) and researchers in Indonesia in several approaches, e.g. joined research and joined higher degree research supervision, as well all joined research degree program. This presentation will discuss some experience in such collaboration between the author and Indonesian academics and identify future opportunities.

Alin Fithor

Badan Riset dan Inovasi Nasional (BRIN), Indonesia

Mangunharjo Beach, Semarang : Contribution to Society 5.0

Mangunharjo Beach in Semarang, Indonesia, is a popular coastal destination known for its beautiful scenery and recreational activities. Which focuses on the integration of technology and innovation for the betterment of society. Here are some potential contributions: (1) Sustainable Tourism, (2) Digital Transformation, (3) Smart City Integration, (4) Community Engagement, and (5) Cultural Preservation. By embracing these contributions, creating a sustainable and inclusive destination that leverages technology for the betterment of both visitors and the local community.

Eli Jamilah Mihardja

Pusat Studi Geopark Universitas Bakrie Jakarta, Indonesia

What and How of Geoparks: Mass Media Perspectives in Indonesia

A geopark is a region with significant and intriguing geological history. Due to its exceptional geological, biological, and cultural potential, Indonesia deserves and needs this designation. Currently, ten geoparks in Indonesia have received global recognition as UNESCO Global Geoparks. However, the efforts and accomplishment of becoming a world heritage site may be in vain if it is not known, supported, and of interest to the entire Indonesian population. In this situation, the media play a crucial role. It is necessary, therefore, to investigate the media's perspective on the formation and acquisition of UNESCO Global Geopark status. The research was conducted using both quantitative and qualitative methods. Using quantitative text analysis, framing analysis, and supplemented by in-depth interviews, data was extracted from national conventional mass media coverage and processed. The anticipated outcome is a recommendation for geopark administrators and activists to identify opportunities and challenges in socializing geoparks with the goal of preserving natural resources and promoting sustainable well-being.



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Session 4.1



Nurbaiti

Universitas Pertahanan RI, Indonesia

INDONESIA NICKEL MANAGEMENT ON STATE DEFENSE AND ENERGY SECURITY

Nickel is an important component of battery materials that supports the use of Internal Combustion Engine vehicles to electric vehicles. Indonesia has the largest nickel reserves in the world, especially in southeast Sulawesi and central Sulawesi. The research issues are that the management of nickel resources has not been maximized and has not been controlled by Indonesia and its role in national defense and energy security. There are three largest nickel management companies that are dominated by China, namely PT. Virtue Dragon Nickel Industry (VDNI), PT. Obsidian Stainless Steel (OSS) and PT. Indonesia Morowali Industrial Park (IMIP). The objective of this study is to analyze nickel management in terms of national defense, threats, and the role of nickel in strengthening energy security and national defense. This study used qualitative methods. Data obtained from the participants were analyzed using a qualitative analysis technique. The results show that nickel management was not able to achieve national interests, contrary to Article 33 of the 1945 Constitution. China conducts monopsony and extended quasi-territory on nickel processing with sharp power, and its management provides negative externalities to the environment that endanger the people, so that it can threaten national defense. These threats include national threats in the form of potential originating from One Belt One Road (OBOR) and state actors. Nickel can be used as a defense system, electric vehicle batteries for certain military operations and anti-radar paint, and nickel can support the availability and acceptability aspects to support Indonesia's energy security. The Conclusions of nickel management are related to China's actions in controlling Indonesian nickel, which have an impact on national defense and Indonesia's energy security.



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Teguh Haryo Sasongko

Institute for Research, Development, and Innovations, International Medical University (Malaysia)

Profile of ASEAN research collaborations with special focus on Indonesia; Scopus analyses 2000 – 2022

Collaboration among ASEAN research communities is crucial for fostering innovation, knowledge exchange, and addressing regional challenges. However, despite the potential benefits, the extent of collaboration within ASEAN remains an underexplored area. This study aims to shed light on the current state of collaboration among ASEAN research communities by analyzing Scopus data from 2000 to 2022. Across 23 years, ASEAN produced over 1.5 million scopus-indexed publications. Top 5 ASEAN producers of scientific papers are Malaysia (453K), Singapore (389K), Indonesia (313K), Thailand (272K), and Viet Nam (119K). The top 3 areas of research include engineering, computer science, and medicine. Governments of Malaysia, Thailand, and Singapore are the main funders. Despite, these voluminous scholarly publications, the papers were barely produced from collaborations between ASEAN countries. Except between Malaysia and Indonesia, no other ASEAN countries showed any other ASEAN counterpart as their top 5 collaborators. With 17K joint papers (mostly on Engineering), Malaysia is Indonesia's top collaborator, while Indonesia ranked 5 as Malaysia's collaborator. Malaysian institutions are the dominant funders in collaborations between Indonesian and Malaysian institutions. Across the span of 23 years, Indonesia's collaboration produced 4.2K papers with Thailand, 2.6K papers with Singapore, and 1.9K papers papers with each Viet Nam and Philippines. With the latter countries, Japan, US, and European funders dominated the publications. In conclusion, there is a lack of substantial collaboration between ASEAN countries in terms of research output. The limited intra-ASEAN collaboration highlights the need for increased efforts to foster collaboration and knowledge exchange within the region. Governments, research institutions, and funding agencies should consider promoting and supporting initiatives that encourage cross-border collaborations, especially between countries like Indonesia and its ASEAN counterparts. Strengthening ASEAN research collaborations has the potential to drive innovation, address regional challenges, and advance scientific progress in the ASEAN community.

Thomas Soseco

Universitas Negeri Malang, Indonesia

Women's Economic Engagement and Decision-Making in the Conversion to Cleaner Energy

In Indonesia, cleaner energy conversion was implemented in 2007 and has since reduced energy-related spending and enhanced household members' engagement in economic activities. This study examines the effects of renewable energy conversion on women's employment rates and involvement in household decision-making. Data are examined using a difference-in-difference (DiD) method from wave 3 (2000) to wave 4 (2014) of the Indonesian Family Life Survey (IFLS). Our findings indicate that the usage of renewable energy has a considerable influence on urban females who are not household heads and boosts economic involvement among women as measured by their working hours. It elevates females' status in the family's decision-making process regarding the child's education, having a substantial influence in metropolitan settings. We also discover that education plays a significant role, with favourable effects on working hours and the shifting effects of positions of decision-making when included as a covariate.



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Ratu Putri Intan Shafira

Universitas Islam Negeri Sultan Maulana Hasanuddin, Banten Indonesia

English for Business to Improve Sales in Indonesian SME and Going Global in 5.0 Era

SME is our nation's pivoting fulcrum in economy growth. To fully maximize the growth of Indonesian economy, SMEs need to export their products. Oftentimes, the online marketplace used in exporting their products are presented in the English language, like Amazon, Alibaba, etc. Selling products using foreign or international platform like Amazon or Alibaba is more profitable than selling on local or localized platforms like the ones existed in Indonesia. This is a big time chance for Indonesian business leaders, and why knowledge about this should be on top of priorities for them. One of the skills needed to be able to operate today's modern technologies is English skill. Without English ability, it will be hard to interpret the commands on the platforms and communicate with customers and make selling.

The aim of this study is to analyze the difficulties by Indonesian business leaders in exporting their products internationally and the strategies to overcome it. This study employs qualitative method with case study analysis from one small and one medium company. For the data, a questionnaire and an interview is administered. The problems found by Indonesian business leaders are oftentimes the difficulty and obliviousness to access proper English lessons and the unsupportive environment for establishing English skills. The skills found to be difficult for SMEs' employees are including speaking, reading, writing, and listening respectively. Therefore, we need to figure out solutions such as for the government to conduct workshops, generating a free website to learn business English, and granting subsidies for free online English courses for the enterprises' employees. Business leaders and employees can also utilize free online platform such as Duolingo. Then, Indonesian SMEs can be world-leading exporters in the international stage.

Keywords: SME, English, business, communication, marketing, control, platform, marketplace.



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Agus Supriyadi

Bappelitbangda Kota Banjar, Provinsi Jawa Barat

Community Resilience Development Based on KB Village (Kampung KB) that Supports Sustainable City Development, Evidence Banjar Municipality

Community Resilience (CR) has become the concern of world academics in both urban and rural studies. The Covid-19 pandemic, apart from encouraging digitization, also provides a new space for people to innovate and move together; therefore, community resilience is critical in facing external and internal challenges. The concept of village-based community resilience is a strategy that puts forward the concept of family resilience as the backbone of encouraging community resilience. The focus on handling stunting cases, which have become the attention of the central government, provides space for new thoughts in efforts to deal with and overcome these problems in the future. The research was conducted in the City of Banjar to obtain a community resilience strategy based on Kampung KB, where this research has innovative research that integrates principles for building social-ecological resilience into a framework and provides a step-by-step process to encourage community resilience. Based on a literature review, this study analyzed the concepts of family physical resilience, community social resilience, and psychological resilience and identified the vital inhibiting variables through interviews with related parties. The findings of this study indicate that implementing the KB village concept with government intervention has significantly encouraged and increased community resilience in facing challenges and shocks, both natural and non-natural disasters.



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LATIFAH NUR AINI

Indonesia

BERSATU MENYONGSONG ILMIAH INDONESIA UNTUK MASA DEPAN BANGSA YANG MAJU DAN BERKELANJUTAN

Pada tahun 2045, Indonesia bertujuan menjadi negara yang maju dan berkelanjutan, menggantikan status negara Indonesia yang dulunya sebagai negara berkembang. Keberhasilan dalam mencapai tujuan ini tidak lepas dari memanfaatkan adanya ilmu pengetahuan. Di Indonesia memiliki kemampuan dalam bidang ilmiah yang juga sangat di kembangkan. Namun, untuk mencapai keberhasilan tersebut masyarakat Indonesia harus diberikan ilmu mengenai ilmu ilmiah, masyarakat Indonesia bisa didapatkan ilmu ilmiah mulai bangku sekolah juga ada berbagai pelatihan mengenai keilmiah di media sosial. Di era globalisasi dan kemajuan teknologi, pengetahuan dan inovasi sangat berkembang menjadi faktor penting dalam mencapai kemajuan ekonomi dan sosial. Informasi di media sosial pun sangat bisa diakses untuk masyarakat luas. Untuk mencapai keberhasilan yang berkelanjutan, Indonesia perlu berinvestasi maupun bekerja sama dalam penelitian dan pengembangan ilmiah, serta memastikan adanya komunikasi yang erat antara pemerintah, institusi, pendidikan, dan sektor swasta. Salah satu tantangan utama adalah rendahnya investasi dalam penelitian dan pengembangan. Untuk mendorong pengembangan ilmiah yang baik dibutuhkan investasi.

Pertama pemerintah Indonesia harus mendorong investasi yang lebih besar dalam penelitian ilmiah pengembangan riset memfasilitasi kebutuhan bangsa melalui kolaborasi antara peneliti universitas dan industri. Kedua pendidikan harus menjadi fokus utama dalam menyatukan keunggulan ilmiah Indonesia dengan peningkatan di bidang pendidikan sains dan teknologi sejak usia dini hingga pendidikan tinggi terus didorong untuk menghadapi tantangan global.

Ketiga kolaborasi dan kerjasama antara sektor publik dan swasta harus ditingkatkan untuk mendorong inovasi kerjasama antara universitas lembaga penelitian dan industri harus dilakukan demi tercapainya komunikasi juga koneksi dalam pengembangan penelitian ilmiah dan riset. Dalam tercapainya rangka meningkatkan pengembangan ilmiah di Indonesia penting untuk memperkuat kesadaran masyarakat tentang pentingnya penelitian dan inovasi. Indonesia memiliki potensi besar untuk mengembangkan keunggulan ilmiah yang dapat menggerakkan pertumbuhan ekonomi meningkatkan kualitas hidup masyarakat dan menjawab tantangan global yang kompleks pengembangan ilmiah yang berkelanjutan akan membawa Indonesia menuju masa depan yang lebih maju berkelanjutan dan inovatif.



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Abstract

Session 4.2



Forum Ilmiah Diaspora Indonesia

Sitti Maesuri Patahuddin

University of Canberra, Australia

Exploring Gender Disparities in Facebook Usage Among Teachers: Striving to Close Gender Disparities in Teacher Professional Development

Facebook users' profiles and engagement have been shown to differ by gender. While social media can provide equitable and accessible spaces for professional learning for all genders, this area has garnered limited attention. This study examined gender differences of 440 Indonesian mathematics teachers, in relation to Facebook socio-demographic variables (i.e., for how long the users have been on Facebook, device types and locations of accessing Facebook, and the size of Facebook networks), with the intention of exploring whether Facebook Groups (FGs) can be utilized as a professional development tool. Statistical analyses revealed no differences between male and female teachers in terms of how long they have been using Facebook. However, access to Facebook varied widely by place (females at home c/f. males at work). There were also significant gender differences in the method of accessing Facebook (females via mobile phones and tablets c/f. males via laptops and desktops). In terms of the number of friends the participants had on Facebook, there were no significant gender differences. However, the number of FGs that they belonged to differed slightly. Most females belong to ten or fewer FGs, with a larger percentage of females belonging to less than six FGs. This study further revealed no gender differences in the type of educational FGs most valued by participants, their reasons for selecting most valued FGs, and the disliked aspects of engaging with the group. Overall, the study shows that FGs offer a way for equal and accessible professional development for both men and women.

Andante Hadi Pandyaswargo

Waseda University, Japan

Smart Technologies May Boost Growth, but Understanding People's Challenges Is Key

Indonesia is blessed with youthful demographic and abundance of natural resources. But the world's overwhelming speed of automatization through smart technologies may undermine those advantages. The good news is, Indonesian people are also known for their creativity and diversity, strengths that produce things not easily replaceable by machines. Studies have also shown that placing people at the center is the only way to ensure the sustainability of a smart technology adoption. Therefore, Indonesia has the potential of reaping optimum benefits by combining the 'bonuses' with a wise smart technology adoption. This talk presents exploratory case studies that demonstrate a people-centered process of seeking the potential of smart and sustainable technologies adoption. Namely; A study on designing renewable energy systems for off-grid communities, and an electric vehicle technology readiness assessment in Indonesia. Additionally, a case study from Japan on autonomous vehicle adoption potential is also discussed as a comparison. Key findings from the respective studies are: 1) The need for a local-economy integrated renewable energy system and exemption from restrictive pricing regulation, 2) A closer communication and collaboration between electric vehicle technology readiness stakeholders, and 3) An autonomous car-sharing business model for reduced carbon footprint and financial commitments of potential users. Ensuring smart technology adoption is motivated by the goal of solving existing social issues rather than being technology-driven, will lead to better sustainability and minimize investment risks. Finally, this talk invites collaboration in solving Indonesia's waste management challenges with smart waste management technologies.



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Kevin William Andri Siahaan

Universitas HKBP Nommensen Pematangsiantar, Indonesia

Student Perceptions of The Effectiveness of Using Computer Simulation and Animation in Chemistry Learning in Senior High Schools in Indonesia

The development of information and communication technology (ICT) has dramatically changed the roles of teachers and students in the classroom. This, for example, translates into the current use of computer simulations and animation in chemistry lessons. However, there has been no exploration of student cognition on the use of information and communication technology in learning subjects. Therefore, this study examines students' cognition of the use of computer simulations and animations in chemistry learning. This study used a mixed methodological approach to collect quantitative and qualitative data from 156 participants through questionnaires and group discussions. Quantitative data were analyzed in detail using frequency and percentage, while qualitative data was analyzed thematically. The findings show that most (70%) students find computer simulation and animation (CSA) easy to use. Furthermore, an average of 76% of students have a positive understanding of the benefits of CSA in learning chemistry concepts. In addition, 72% have a very positive attitude towards the use of CSA and 78% of students have a very positive understanding of the behavior intention of using CSA in teaching and learning chemistry concepts. However, 87% of students have a strong understanding that having adequate information and communication technology resources in school and access to computer laboratories can influence them to learn chemistry concepts with computers as educational tools. Therefore, the current study suggests that the use of computer simulation and animation should be emphasized in the teaching and learning of chemistry concepts in high school

Aghesna Rahmatika Kesuma

UIN Raden Intan Lampung, Indonesia

Application of Green Library Concept in Improving Librarian Performance

The library is a very important part in the world of education, especially in the current era of society 5.0 which allows humans to use technology-based knowledge as a human need to be more effective. For this reason, libraries must also maintain their existence by keeping up with technological developments that are growing rapidly. As a place for storing information, the library also needs to provide a comfortable place for users and librarians, for this reason, with the application of the concept of a green library, which in its development applies more to sustainable development and pays attention to sustainable, earth-friendly, and friendly to the surrounding environment, of course it can minimize pollution around the library such as air pollution, sound pollution, and other pollution that can interfere with activities in the library. With the application of the concept of green library can create a library that is comfortable, and free from pollution. The existence of a comfortable and conducive room will be directly proportional to the effectiveness of librarian performance.



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Abstract

Session 4.2



Alhamuddin

Universitas Islam Bandung, Indonesia

Arabilitas: Website-Based Arabic Language Learning Application and Teaching Materials For Students With Disabilities In Higher Education

This research aims to design learning media in the form of Web Accessible for blind students. This is done to help blind students understand the material with learning media that suits their characteristics. This research considers the experience of blind students in implementing online learning in higher education and their needs for learning media in the form of E-learning. The results of the data collection will be used as recommendations in developing learning media that can help blind students in online learning in higher education. This research emphasizes that the features that must be present in the learning media must answer the obstacles faced by blind students in online learning in higher education. Web Arability is the answer to help the difficulty of learning Arabic. The result is an increase in understanding in learning Arabic when using Web Arabilitas

Riskina Juwita

Tokyo University of Agriculture, Japan

Sixth Industrialization in Indonesian Nutmeg Production : Utilization of Local Agricultural Resources for Rural Development

Nutmeg (*Myristica fragrans* Houtt.) industry in Indonesia has developed extensively from production of nutmeg fruits to processing of various nutmeg products. Currently Indonesia supplies more than 50% of the world's total demand for nutmeg spices and nutmeg oil. Development of nutmeg industry also plays an important role as income sources for the local community and has brought impact in enhancing the rural economy. However, development nutmeg industry in Indonesia has still faced several severe problems, especially in providing sustainable and high-quality products for international market. This research aims to analyze the actual condition of nutmeg cultivation, processing, distribution and sales in nutmeg producing areas in Indonesia from technological, management and industrial development perspectives and to examine the benefits and limitations of three different development patterns of the nutmeg industry in Indonesia, such as government-support pattern, cooperative-support pattern, and individual pattern, in order to determine potential development pattern for nutmeg industry in the future. This research has been conducted through field survey and case studies in four important nutmeg producing areas in Indonesia, namely Fakfak Regency, West Papua Province; South Aceh Regency, Aceh Province; Bogor Regency, West Java Province; and Ternate and Tidore Regency, North Maluku Province.



Abstract

Session 4.2



Forum Ilmiah Diaspora Indonesia

Susanto

Universitas Bandar Lampung, Indonesia

LinguaForense: Prototipe Aplikasi Berbasis Python untuk Analisis Linguistik Forensik

Dalam dunia modern yang terus berkembang, penting untuk mengembangkan metode analisis yang efektif dalam bidang forensik, terutama dalam analisis linguistik forensik. Dalam tulisan ini, kami ingin memperkenalkan "LinguaForense", sebuah prototipe aplikasi berbasis Python yang kami rancang khusus untuk analisis linguistik forensik. Prototipe aplikasi ini didasarkan pada metode pengolahan bahasa alami (natural language processing) dan menggunakan beberapa teknik seperti pemrosesan teks, klasifikasi, dan penambahan informasi. Aplikasi ini menerima masukan teks berupa dokumen atau percakapan dalam bentuk teks, dan kemudian menganalisis struktur dan konten bahasa dalam teks tersebut. Beberapa fitur utama yang disediakan oleh prototipe aplikasi ini antara lain analisis sentimen, klasifikasi teks, dan identifikasi penulis. Analisis sentimen digunakan untuk menentukan emosi atau pendapat yang terkandung dalam teks, sedangkan klasifikasi teks digunakan untuk mengidentifikasi jenis teks tertentu, misalnya apakah teks tersebut merupakan pesan ancaman atau spam. Identifikasi penulis memanfaatkan analisis stilistika untuk membandingkan ciri-ciri linguistik dalam teks dengan profil penulis yang sudah ada. Selain itu, prototipe aplikasi ini juga menyediakan alat visualisasi yang membantu pengguna dalam memahami hasil analisis secara lebih intuitif, seperti grafik dan diagram. Pengguna juga dapat melakukan penyesuaian dan pengaturan tambahan sesuai dengan kebutuhan mereka. Melalui pengembangan prototipe aplikasi ini, diharapkan dapat membantu ahli forensik linguistik dalam menganalisis teks dengan lebih efisien dan akurat. Aplikasi ini memiliki potensi untuk digunakan dalam berbagai kasus forensik yang melibatkan analisis linguistik, seperti investigasi kejahatan cyber, penyelidikan pidana, dan analisis pesan terenkripsi.

Mukhamad Angga Gumilang

Politeknik Negeri Jember, Indonesia

Hate Speech Intolerant Analysis Detection: A Proposed Method

Hate speech generally refers to expressions that incite harm (particularly discrimination, hostility, or violence) against a specific target based on the target's identification with a particular social or demographic group. Hate speech can also include expressions that encourage a climate of prejudice and intolerance, assuming that such a climate can lead to discrimination, hostility, and targeted violence. Intolerant Analysis is also a proposed solution for detecting social media accounts that have the potential to continue to spread hate news. In the perspective of the field of psychology, early detection is done by studying the behavior patterns and characteristics that are raised by social media account users based on the history of previous posts. This method is known as a predictor of new phenomena that will appear so that there is an initial step in preventing a predicted bad condition/thing from happening. In the case of hate speech, predictor techniques are used for the early detection of accounts that have the potential to continue to spread hateful information. This research proposed a method to classify intolerant and tolerant twitter comments, not just the sentiment. The performance of sentiment algorithm is 87% of accuracy and the performance of intolerant algorithm is 96% of accuracy. Although the accuracy is high, the algorithm still needs more validation from expertise in psychologist.



Abstract

Session 4.2



Ani Nur Karimah

Universitas Airlangga, Indonesia

Komunitas Bawean Baru: Kehidupan orang-orang Bawean di Tulungagung tahun 1942-1990

Penelitian ini membahas mengenai kehidupan komunitas Bawean di perantauan sejak tahun 1942-1990 yang menunjukkan adanya akulturasi dari komunitas Bawean sebagai bentuk dari interaksi terbuka dengan masyarakat setempat. Ketika banyak penelitian tentang komunitas Bawean di luar negeri, penulis mengambil scope lokal sebagai fokus penelitian yang justru berdampak pula pada perkembangan tingkat lokal.

Dr. Fitria Dewi Navisa, SH, MKn, MH

Universitas Islam Malang, Indonesia

Urgensi Pemanfaatan Obligasi Daerah Sebagai Upaya Pembiayaan Pembangunan Daerah

Penerbitan Obligasi Daerah dapat menjadi faktor penting bagi Pembangunan daerah di suatu negara. Sebagai Alternatif Sumber Pembiayaan bagi Daerah dalam mengembangkan infrastruktur daerah, Obligasi daerah memainkan peranan yang penting ke depan untuk membantu pemerataan pembangunan di daerah- daerah di Indonesia. Dengan adanya kewenangan yang dimiliki otonomi daerah di Indonesia, memberikan kesempatan untuk setiap pemetintah daerah di Indonesia untuk menerbitkan obligasi daerah. Untuk mendukung kebijakan ini, pemerintah telah membuat peraturan Peraturan-Peraturan untuk Penerbitan Obligasi Daerah. Akan tetapi adanya obligasi daerah tidak mampu dimanfaatkan oleh pemerintah daerah karena belum banyak yang mengetahui mengenai kebijakan ini, yang mana disebabkan oleh kurangnya sosialisasi oleh pemerintah pusat. Dengan penelitian ini, tujuan penulisan ini diharapkan dapat membantu proses Penerbitan Obligasi Daerah di Indonesia, metode penelitian yang digunakan dalam penulisan ini ialah yuridis normatif dengan melakukan pendekatan melalui pendekatan perundang- undangan dan pendekatan konseptual. Dalam penelitian ini banyaknya pemerintah daerah yang belum memahami terkait proses pnegajuan sampai pada penerbitan obligasi berakibat hambatan bagi pemerintah daerah untuk berinovasi baik secara kelembagaan maupun sumber daya manusia nya sendiri.

Kata kunci: Obligasi daerah, Pemerintah daerah, Pembangunan.



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Abstract

Poster Session



Anis Siti Nurrohkayati

Universitas Muhammadiyah Kalimantan Timur, Indonesia

Chopping Machines Prototype as an Organic Waste Processor

Waste utilization is used in various sectors such as industry, food, manufacturing, etc. Food or vegetable waste is one type of organic waste. Organic waste can be used as organic fertilizer and animal feed. This study aims to make a prototype of an organic waste chopping machine. Furthermore, the chopped results can be used as raw material for compost or animal feed. The main driving components in the prototype organic waste chopper are electric motors with a power of 1/2 HP and 2880 rpm, reducers with a rotation ratio of 1/20, a pulley ratio of 3/4, and a belt type A-66. Analysis of the prototype design of the organic waste chopper machine, namely the calculation of the planning of the v-belt, pulley, and the calculation of the rate and torque on the blade shaft. The capacity of the chopping results is distinguished based on 2 types of tests, namely testing using a reducer and without a reducer. The types of waste that were chopped were vegetable waste, organic skin waste, and cassava. Testing with a reducer produces shredded waste with a capacity of 16.5 kg/hour. Also, 8.7 kg/hour for organic skin waste, and 26.13 kg/hour for cassava. Meanwhile, the test results without using a reducer resulted in chopped vegetable waste as much as 111.84 kg/hour, and 93.72 kg/hour for organic skin waste.

Nabilla Dewi Septiani

Indian Institute of Technology Madras, India

Amine-Modified Zeolite as a Solid Sorbent for CO₂ Capture

Carbon capture is a process of capturing CO₂ gas from the atmosphere or industry that generates CO₂. One of the industries that release CO₂ is coal power plants, which increase CO₂ emissions rapidly due to higher energy demand. Carbon capture using solid sorbent is one of the promising technologies due to its several advantages, such as high adsorption capacity, lower cost of regeneration, and fast kinetics. The mechanism of CO₂ adsorption on adsorbent is mostly physisorption, which makes adsorbent more effective at ambient temperature. Amine modification on adsorbent is conducted to increase CO₂ adsorption capacity and temperature stability when used at higher temperatures. This experimental work uses amine-modified zeolite 13X as a solid sorbent for CO₂ capture application. The solid sorbent's characterisation has been done using SEM analysis, FTIR, TGA, BET surface area, and micro-DSC analysis. The CO₂ adsorption study is conducted using a laboratory scale of a packed bed reactor. The adsorption capacity and regeneration cycles of amine-modified zeolite are compared with pristine zeolite. From the experiments, amine-modified zeolite performs better adsorption than neat zeolite. This research aims to develop adsorbent material that can give higher CO₂ adsorption capacity which can be applied to capture CO₂ from the flue gas of coal power plants, cement or steel industries, etc.



Abstract

Poster Session



Rike Syahnir

Universitas Muhammadiyah Jakarta, Indonesia

Antimicrobial resistance of nasal Staphylococcus species in lactating mothers and their infants

Common bacteria in the nasal cavity can act as opportunistic pathogens that cause infections under certain conditions. Screening for commensal bacteria in the nasal cavity in nursing mothers can determine antibiotic resistance which can be used as a reference for therapy and prevention of infection in their babies. This study aims to obtain a pattern of sensitivity of Staphylococcus species in the noses of mothers and their babies. A total of 47 pairs of mothers and babies were enrolled using a cross-sectional study design. Nasal swabs were collected and cultured on mannitol salt (MSA) agar. Identification of species and antibiotic resistance using Vitek-2. Overall we found that the most Staphylococcus species was S.aureus. Other species obtained were Coagulase-negative staphylococci (CoNS), namely S.epidermidis and S.haemolyticus S.hominis ssp hominins, S.ludgunensis, S.warneri, S.lentus, S.capitis, S.gallinarum, S.auricularis, and S. saprophyticus. We found 29/47 (62%) S. aureus, 23% MRSA. We also found 29/47 (69%) were methicillin-resistant Coagulase-negative staphylococci (MRCoNS). We found more than 50% of isolates resistant to benzylpenicillin, clindamycin, erythromycin, and oxacillin. The prevalence of MRCoNS nasal carriers is high in lactating mothers and infants on a community basis. Monitoring and control of methicillin-resistant strains is necessary.

Hariyatun

Badan Riset dan Inovasi Nasional (BRIN), Indonesia

Development of Engineered Modular Endolysin as Antimicrobial Candidate

Infection of microbial pathogens, such as Streptococcus and Staphylococcus, can cause diverse animal and human diseases and further systemic infections. The increasing antibiotic resistance of microbial pathogens is a major threat to public health. Bacteriophage modular endolysins and their engineered ones are promising alternative antimicrobial candidates unlikely to evoke antimicrobial resistance. Given the previous success and the potential of its modular design, our study has developed the engineered modular endolysin as a 'tailor-made' antimicrobial candidate specifically targeting Streptococcal and Staphylococcal infections. The research has designed in silico the synthetic gene encoding the engineered modular endolysin and has conducted preliminary study in expression, purification, molecular characterization of the recombinant protein, and bioinformatics analysis on molecular modelling and molecular docking simulations. In the on going and future research, further molecular docking and molecular dynamics simulations as well as Cryo-EM analysis will be conducted to study the predicted binding activity and enzymatic lysis activity as well as structure and functionality of the engineered modular endolysin, respectively. Based on the data of the molecular experiment and bioinformatics analysis, further production of the engineered modular endolysin and its in vitro activity assay will be conducted. In addition, the development of whole genome sequencing (WGS) analysis of bacteriophages from microbial pathogens in Indonesia as well as further development of potential therapy based on bacteriophages and modular endolysins and their engineered ones in order to control microbial pathogen infections in Indonesia will be carry out.



Abstract

Poster Session



Mohammad Hamzah Fauzi

Badan Riset dan Inovasi Nasional (BRIN), Indonesia

Synthesizing $2h/e^2$ Resistance Plateau at the First Landau Level Confined in A Quantum Point Contact

A comprehensive understanding of quantum Hall edge transmission, especially the hole-conjugate of a Laughlin state such as a $2/3$ state, is critical for advancing fundamental quantum Hall physics and enhancing the design of quantum Hall edge interferometry. In this study, we report a robust intermediate $2h/e^2$ resistance quantization in a quantum point contact (QPC) when the bulk is set at the fractional filling $2/3$ quantum Hall state. Our results suggest the occurrence of two equilibration processes. First, the co-propagating $1/3$ edges moving along a soft QPC arm confining potential fully equilibrate and act as a single $2/3$ edge mode. Second, the $2/3$ edge mode is further equilibrated with an integer 1 edge mode formed in the QPC. The complete mixing between them results in a diagonal resistance value quantized at $2h/e^2$. Similar processes occur for a bulk filling $5/3$, leading to an intermediate $(2/3)h/e^2$ resistance quantization.

Yayuk Hidayah

Universitas Negeri Yogyakarta, Indonesia

Menuju 2045: Mengintegrasikan Potensi Ilmiah Indonesia Menuju Kemajuan dan Keberlanjutan Bangsa

Tantangan utama yang dihadapi oleh Indonesia dalam mencapai kemajuan dan keberlanjutan bangsa pada tahun 2045 adalah mengintegrasikan potensi ilmiah yang dimiliki. Penelitian ini bertujuan untuk menjelaskan bagaimana Indonesia dapat mengarahkan keunggulan ilmiahnya menuju tujuan tersebut.

Dalam penelitian ini, kami menganalisis potensi ilmiah Indonesia yang meliputi sumber daya manusia berkompeten, kekayaan alam yang melimpah, dan keanekaragaman budaya. Kami menyoroti pentingnya kolaborasi antara akademisi, industri, dan pemerintah untuk memastikan sinergi dan koordinasi yang efektif dalam mengoptimalkan potensi ilmiah.

Selain itu, kami membahas langkah-langkah konkrit yang perlu diambil untuk mendorong pengembangan keunggulan ilmiah Indonesia. Ini termasuk peningkatan investasi dalam riset dan pengembangan, pembangunan infrastruktur penelitian yang memadai, peningkatan aksesibilitas publik terhadap informasi ilmiah, serta penguatan kerjasama internasional untuk pertukaran pengetahuan dan teknologi.

Dalam konteks kemajuan dan keberlanjutan bangsa, kami mempertimbangkan aspek-aspek seperti peningkatan kualitas pendidikan ilmiah, pengembangan teknologi berkelanjutan, mitigasi perubahan iklim, dan penerapan solusi inovatif untuk memecahkan masalah sosial dan lingkungan.

Melalui upaya kolaboratif dan komitmen yang kuat terhadap pengembangan potensi ilmiah, Indonesia dapat mengarahkan negara ini menuju masa depan yang maju dan berkelanjutan. Hasil penelitian ini memberikan wawasan yang berharga bagi para pengambil keputusan, akademisi, dan praktisi dalam upaya mereka untuk membangun Indonesia sebagai negara yang unggul secara ilmiah dan berkelanjutan pada tahun 2045.



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Forum Ilmiah Diaspora Indonesia

Putu Teta Prihartini Aryanti

Universitas Jenderal Achmad Yani, Indonesia

Negatively Charged Tight SPSf/PEG400/Halloysite Nanotube Ultrafiltration Membrane for High Removal Efficiency of Dyes

Ultrafiltration (UF) membranes are widely used in wastewater treatment due to their high productivity and low energy requirements. However, their limited rejection of soluble contaminants, like dyes, hampers their application as single-stage membranes. In this study, a tight UF membrane was prepared by blending sulfonated polysulfone (SPSf) with polyethylene glycol (PEG400) and halloysite nanotubes (HNT) as additives. The effect of sulfonation time on the UF membrane's morphology, hydrophilicity, porosity, permeate flux, and dye rejection was investigated. The resulting UF membrane exhibited an average porosity of 78% and a hydrophilic nature, as indicated by a water contact angle between 72-80°. The addition of sulfonic acid groups (-SO₃-) to the PSf chain enhanced hydrophilicity and introduced a negative charge. The SPSf/PEG400/HNT UF membrane exhibited the highest rejection rates for Blue 2BLN (95.5%), Naphthol AS (90.4%), and TDS (9.4%). The pure water flux (PWF) was 100 L.m⁻².h⁻¹. The research findings demonstrate that the SPSf/PEG400/HNT tight-UF membrane can serve as a cost-effective and efficient alternative for wastewater treatment, specifically in the case of textile wastewater. The membrane effectively produces clean water that can be reused in various textile industry processes.

Lia Amalia Amrina

Universitas Gadjah Mada, Yogyakarta, Indonesia

Linguistik Landscape on Coffee Shops Singboard in Yogyakarta

The establishment of a very massive coffee shop in the city of Yogyakarta makes it interesting to explore more deeply. This study intends to describe the form, meaning and origin of naming coffee shops in the city of Yogyakarta. The data presented is in the form of sample photos of coffee shops spread across four regencies and the city of Yogyakarta. Based on its shape, the naming of coffee shops is distinguished into polymorphemic and monomorphemic. There are also various language uses in naming coffee shops in Yogyakarta. Semantically, the naming of coffee shops in the regencies and cities of Yogyakarta can be attributed to several references such as the origin of the region, buildings, language games, individual names and history. So, it became preserve the existing culture.



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Abstract

Poster Session



Andi Cudai Nur

Universitas Negeri Makassar

The Influence of Market Orientation on Marketing Performance in Micro Enterprises in the Trade Sector in South Sulawesi.

This study aims to determine the effect of the market orientation of micro-enterprises in the trade sector on the marketing performance of micro-enterprises in the trade sector in South Sulawesi.

This study uses quantitative research methods with data collection techniques using documents and questionnaires. The population in this study was 1,261,643 micro, small and medium enterprises registered with the Cooperatives and SMEs Office of South Sulawesi Province, which was represented by a sample that was selected to represent all elements of micro, small and medium enterprises.

The results showed that for each indicator used in the micro business market orientation variable, the trade sector has a significant effect on the marketing performance of SMEs in South Sulawesi. This is evidenced by the results of the partial test and the results of the simultaneous test, as well as the results of the multiple correlation test showing a strong relationship between variables. There is a positive and significant relationship between the market orientation variable of micro-enterprises in the trading sector on the marketing performance of SMEs in South Sulawesi. That is, the better the market orientation carried out by micro-enterprises in the trading sector, the better the marketing performance of SMEs.

Keywords: Market orientation, Marketing performance, Micro enterprises

Amalina Ghaisani Komarudin

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The D-enantiomer of LL-37 Shows Comparable Antiviral Activity Against Zika Virus As the Native Form of LL-37

Zika virus (ZIKV) is a mosquito-borne flavivirus that is predominantly transmitted by *Aedes* mosquitoes. ZIKV can also be transmitted vertically from mother to fetus and by sexual transmission. There is currently no effective treatment for ZIKV infections, and given the spread of this disease worldwide, there is an urgent need for new, low-cost and efficacious treatments. LL-37, the sole human cathelicidin which are part of the innate immune system, has been shown to have antiviral activity against a wide range of enveloped viral pathogens. However, a major translational limitation of LL-37 is its susceptibility to post-translational modifications (PTMs) including proteolysis. In the present study, we investigated the in-vitro effect of the native form, D-form and scrambled LL-37 on ZIKV infection in A549 cells. The intracellular viral protein was quantified using the In-Cell Western assay. The culture supernatant was assessed for infectious viral particles by plaque forming unit assay and the level of cytokine release was determined using fluorescent microbead immunoassay. The L- and D-form of LL-37 effectively reduce ZIKV infectivity in A549 cells as compared to virus control. In terms of production of viral particles, the addition of D-LL-37 post infection showed infectivity reduction with a better significance than the native LL-37. Treatment of the ZIKV with scrambled LL-37 had no effect on ZIKV infectivity and the viral load as compared to virus control. Molecular docking studies revealed possible binding of L-form and D-form of LL-37 to the ZIKV envelope (E) protein dimer. The D-form of LL-37 binds to ZIKV E protein with a better stability compared to the native form. Together, our in-vitro experiments and in-silico analyses suggest that the native and D-form of LL-37 inhibit ZIKV at the stage of entry into the cells by binding to the E protein and engineering LL-37 into more biologically stable forms improve its antiviral potential against ZIKV infections.



