

Proceedings of the 4th Sriwijaya International Conference on Basic and Applied Sciences

6 November 2025, Palembang, Indonesia

SICBAS 2025

General Chair

Alfensi Faruk, M.Sc., Ph.D., Universitas Sriwijaya, Indonesia

Technical Programme Chairs

Dr. Eng. Bijak Riyandi A., M.Eng., Universitas Sriwijaya, Indonesia

Najma Annuria Fithri, Ph.D., M.Sc., Universitas Sriwijaya, Indonesia

Conference Organization

Steering Committee

Prof. Dr. Taufiq Marwa, S.E., M.Si	Universitas Sriwijaya, Indonesia
Prof. Dr. dr. Radiyati Umi Partan, SpPD-KR, M.Kes	Universitas Sriwijaya, Indonesia
Prof. Hermansyah, M.Si, Ph.D.	Universitas Sriwijaya, Indonesia
Dr. Fiber Monado, M.Si.	Universitas Sriwijaya, Indonesia
Dr. Zainal Fanani, M.Si.	Universitas Sriwijaya, Indonesia
Prof. Dr. Rozirwan, M.Si.	Universitas Sriwijaya, Indonesia

Organizing Committee

General Chair

Alfensi Faruk, M.Sc., Ph.D.	Universitas Sriwijaya, Indonesia
-----------------------------	----------------------------------

Secretary

apt. Najma Annuria Fithri, M.Sc., Ph.D.	Universitas Sriwijaya, Indonesia
apt. Alinda Tania, M.S. Farm.	Universitas Sriwijaya, Indonesia

Treasurer

Dr. Melki	Universitas Sriwijaya, Indonesia
-----------	----------------------------------

Vice Treasurers

Sya'bandi, S.Ap.	Universitas Sriwijaya, Indonesia
Diah Wijayanti, S.E.	Universitas Sriwijaya, Indonesia

TPC Chair and Co-Chair

Dr. Eng. Bijak Riyadi Ahadito, M.Eng	Universitas Sriwijaya, Indonesia
apt. Najma Annuria Fithri, M.Sc., Ph.D.	Universitas Sriwijaya, Indonesia

Event Section Chairs

Dr. Assaidah, M.Si.	Universitas Sriwijaya, Indonesia
Tengku Zia Ulqodry, Ph.D.	Universitas Sriwijaya, Indonesia

Publication Chairs

Prof. Dr. Poedji Lockitowati H, M.Si	Universitas Sriwijaya, Indonesia
Dr. Muhammad Said, M.T.	Universitas Sriwijaya, Indonesia
Dr. Evi Yuliza, M.Si.	Universitas Sriwijaya, Indonesia
Alfensi Faruk, M.Sc., Ph.D.	Universitas Sriwijaya, Indonesia
Dr. Addy Rachmat, M.Si.	Universitas Sriwijaya, Indonesia
Beta Susanto Barus, M.Si., Ph.D.	Universitas Sriwijaya, Indonesia

Publicity & Social Media Chairs

Dr. Hartoni, M.Si.	Universitas Sriwijaya, Indonesia
M. Syukri	Universitas Sriwijaya, Indonesia

Accommodation & Transportation Chairs

Dr. Sarno, M.Si.	Universitas Sriwijaya, Indonesia
Rizki Aidil	Universitas Sriwijaya, Indonesia

Sponsorship and Exhibit Chair

Dr. Isnaini	Universitas Sriwijaya, Indonesia
-------------	----------------------------------

Technical Program Committee

Hadi, M.Si.
Beta Susanto Barus, M.Si., Ph.D.
Dr. Addy Rachmat, M.Si.
Dr. Akmal Johan, M.Si.
Dr. Widia Purwaningrum, M.Si.
Evi Yuswita, S.E.
Reni Anggraini, S.Kom.
Salatin Tajudin
M. Fuad, M.Si.
Supriadi
Ervina, S.Si.
Bambang Ariffin

[illegible]

Preface

We are delighted to introduce the proceedings of the fourth Sriwijaya International Conference on Basic and Applied Sciences (SICBAS) 2025. The SICBAS 2025 is a biennial international conference carried out regularly by Universitas Sriwijaya since 2018. Under the theme of the conference “Innovative Sciences for Sustainable Development Goals” with the sub-themes Mathematics and Its Applications, Physics and Applied Physics, Chemistry and Applied Chemistry, Biology and Applied Biology, Marine Science, Pharmacy, Environmental Sciences, and Basic Science Education.

This conference features four keynote speeches delivered by Prof. Xiaowei Wang, Baker Heart and Diabetes Institute, Australia; Assoc. Prof. Shuichi Suzuki, Ph.D., Department of Chemistry, The University of Osaka, Japan; Dr. Berry Juliandi, IPB University, Indonesia; Prof. Dr. Muhammad Irfan, Department of Physics, Universitas Sriwijaya, Indonesia, and six invited speakers by Assoc. Prof. Dr. Georgios Aivaliotis, School of Mathematics, University of Leeds, The United Kingdom (UK); Dr. Karla Ximena Vazquez-Prada, Memorial Sloan Kettering Cancer Center, USA; Dr. Sandipan Mondal, National Taiwan Ocean University, Chinese Taipei; Dr. Yosie Andriani HS, Universiti Malaysia Terengganu, Malaysia; Prof. Herry Purnomo, IPB University, Indonesia; and Dr. Elfi Yuliza, Universitas Bengkulu, Indonesia.

The conference received a total of 62 paper submissions from diverse academic backgrounds. Following a rigorous peer-review process conducted by our technical committee to ensure high quality and thematic relevance, 25 papers were accepted for presentation and inclusion in these proceedings. This selection reflects the most promising contributions to the field, addressing the urgent need for scientific innovation. The 4th SICBAS 2025 serves as a vital bridge, bringing together distinguished professors, researchers, and scholars from across the globe to foster international collaboration.

By providing a professional platform for the dissemination of cutting-edge research and emerging trends in science and technology, the conference encourages the kind of cross-disciplinary dialogue necessary to meet global sustainability challenges. All accepted and presented papers will be published in the European Alliance for Innovation (EAI) Proceeding (EAI Computing and Communication in Emerging Regions - CCER Series), ensuring that these findings reach a wide international audience. It is our sincere hope that the insights shared here will spark new inquiries and that future SICBAS events will remain as intellectually stimulating and impactful as the contributions gathered in this volume.

Alfensi Faruk, M.Sc., Ph.D.

Contents

Mathematics and Its Application

Analysis of Changes in Weather Elements Clustering in Pagar Alam in 2023 and 2024 Using K-Means and Average Linkage Clustering Methods <i>Sri Indra Maiyanti, Irmeilyana Irmeilyana, Putri Nilam Cayo, Ngudiantoro Ngudiantoro</i>	1
Stunting Prediction in South Sumatra Province, Indonesia: Machine Learning Approaches Using SKI 2023 <i>Alfensi Faruk, Dian Cahyawati, Endang Sri Kresnawati</i>	20
Application of Procrustes Analysis in the Comparison of Two Data Matrices of Green Cherry Fruit Production of Pagaralam Robusta Coffee <i>Irmeilyana Irmeilyana, Bambang Suprihatin, Sri Indra Maiyanti, Dita Irfanul Khasanah, Ngudiantoro Ngudiantoro, Anita Desiani</i>	32
Exploration of the CHAID Method in Detecting the Relationship among the Factors Related to the Prevalence of Undernourishment <i>Rahmat Trianto, Dian Cahyawati, Endro Setyo Cahyono, Eka Susanti, Alfensi Faruk</i>	48
Comparison of Classification Results of Categorical Boosting and Extreme Gradient Boosting Methods in Obesity Class Diagnosis <i>Jonatan Jonatan, Giska Auria, Anita Desiani, Ali Amran, Indri Ramayanti, Irmeilyana Irmeilyana</i>	58
Application of Fuzzy Pentagonal Number Matrix with Robust Ranking Defuzzification Method in Disease Diagnosis <i>Yosua Fernando Sitinjak, Mashadi Mashadi</i>	72
The Double Butterfly Theorem on Hyperbolas <i>M. Teguh, Mashadi Mashadi</i>	92
Application of Hexagonal Fuzzy Soft Matrices in The Diagnosis of Respiratory Tract Infections, Common Cold, and Pharyngitis <i>Callista Monalisa, Mashadi Mashadi</i>	105
Numerical Study of An NPZOC Model: Integrator Performance, Bloom Dynamics, and Stability Transitions <i>Nur R. Azzahra, La Zakaria, Agus Sutrisno, Netti Herawati, Sandhita A. Khansa, Dorrah Azis</i>	124

Physics and Its Application

Linear Calibration Modelling of the BME280 Sensor for Accurate Environmental Data Acquisition <i>Hadi Hadi, Octavianus Cakra Satya, Hadir Kaban, Rendy Apriansyah, Aflonita Suhana</i>	142
Synthesis, Characterization of Chitosan-PVA Films Embedded with Curcumin-Capped CuO Nanomaterials for Antibacterial Activity Against Escherichia Coli <i>Ahmad Fatoni, Ummi Rahmaniar, Rahma Agustini, Yeni Sri Wahyuni, Nurlisa Hidayati</i>	151

Micromagnetic Study on the Influence of Nanowire Width and Dzyaloshinskii–Moriya Interaction on Domain Wall Propagation in CoFeB Nanowires under Nanosecond Current Pulses	163
<i>Della Nurbaiti, Maria Metantomwate, Aysa Sabrina, Melenia Tambunan, Mahfuddin Zuhri, Ramlan Ramlan, Candra Kurniawan</i>	
Analysis of the Impact of Silicone Carbide (SiC) as a Reinforcement on Composite Properties	173
<i>Ramlan Ramlan, Endah Puspita, Akhmad Aminuddin Bama, Melenia Tambunan</i>	
Seismic Hazard Analysis Based on Peak Ground Acceleration and Modified Mercalli Intensity in North Bengkulu Regency, Bengkulu Province	181
<i>Arif Ismul Hadi, M. Farid, Refrizon Refrizon, Budi Harlianto, Darmawan Ikhlas Fadli, Hana Raihana, Andre Rahmat Al-Ansori, Dama Rahma Sagita, Erlan Sumanjaya, Reni Mulyasari</i>	
Chemistry and Applied Chemistry, and Pharmacy	
Utilization of Petroleum Sludge Waste as an Al-Fe Oxide/C Adsorbent and Its Characterization	189
<i>Zainal Fanani, Alya Selviani, Arum Setiawan, Julinar Julinar</i>	
Improved Separation and Adsorption of Ciprofloxacin Using Magnetic Graphene Oxide	201
<i>Rinawati Rinawati, Agung Abadi Kiswandono, Widiarti Widiarti, Amelia Rizky Az-zahra, Herlian Eriska Putra, Dian Septiani Pratama</i>	
Integrating Language and Science: A CLIL-Based English for Chemistry Digital Module	212
<i>Putri Adita Wulandari, Roza Linda, Tri Padila Rahmasari, Muryanti Muryanti, Nurul Masyithah Rery</i>	
Synergistic NaOH–Ultrasonic Activation of Palm Shell–Derived Carbon for Enhanced Adsorption of Naphthol Yellow Dye	222
<i>Intan Lestari, Sultan Leofayuda, Diah Riski Gusti, Damris Muhammad</i>	
Variation of Functional Monomers for The Preparation of Imprinted Polymers for Selective Analysis of Glibenclamide	233
<i>Lasmaryna Sirumapea, Ensiwi Munarsih, Mauizatul Hasanah, Hilma Hilma, Romsiah Romsiah, David Darwis</i>	
Synthesis and Characterization of Ni _{0.5} Co _{0.5} TiO ₃ Composite with Polyvinyl Alcohol (PVA) as Microwave Absorber	240
<i>Melenia Tambunan, Atri Yani, Yunasfi Yunasfi, Ramlan Ramlan</i>	
Biology, Marine Science, and Environmental Science	
Association of Sanitary Latrine Ownership and Clean Water Availability with Open Defecation Practices in 14 Ulu Village, Seberang Ulu II District, Palembang City	251
<i>Tega Indah Suryani, Yadi Oktariansyah, Dwi Septiawati, Laura Dwi Pratiwi, Yuanita Windusari</i>	
Sustainable Biodiesel Synthesis from Waste Cooking Oil Using Eggshell and Coffee Husk Catalyst	264
<i>Vebria Ardina, Vany Mei Lia, Rahmi Rahmi, Lenny Marlinda</i>	

Mangrove Growth After Five Years of Restoration on Former Fish Pond Land with Planting and Enrichment Patterns in Berbak-Sembilang National Park <i>Tengku Zia Ulqodry, Rahmad Fadly Azani Siregar, Afan Absori, Sarno Sarno, Indah Widiastuti, Riris Aryawati, Muhtadi Muhtadi, Andi Agussalim</i>	273
Sustainable Production and Multidisciplinary Applications of Phycocyanin: A Systematic Review <i>Eva Musifa, Alinda Tania, Indah Indah, Yadi Oktariansyah, Yuniar Harvianti, Amanda Astri Pratiwi Febrianti</i>	284
Integrating South Sumatra's Local Wisdom into Ethno-STEM Based Differentiated Learning on Global Warming: A Preliminary Study to Improve Critical Thinking and Environmental Literacy among Class X Students <i>Rosdiana Rosdiana, Ida Sriyanti, Ismet Ismet, Hamdi Akhsan</i>	304