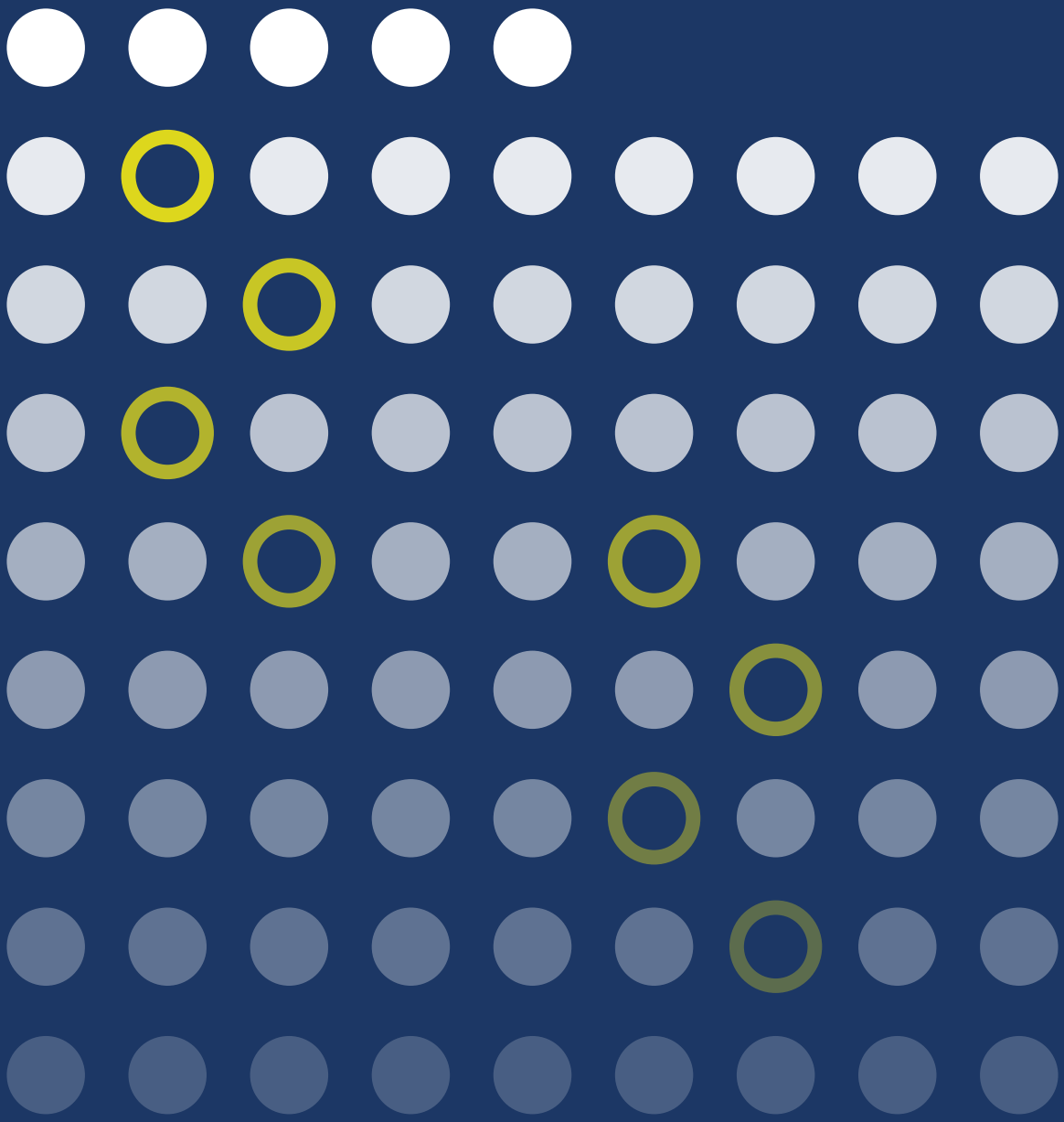


Research & Innovation

WRRI ITB | Vice Rector for Research and Innovation

2023

Research & Innovation

WRRI ITB | Vice Rector for Research and Innovation | 2023

Table of Contents

Table of Contents

Prof. Ir.

I Gede Wenten,

M.Sc., Ph.D.

Vice Rector for Research and Innovation

As a leading technical university, ITB remains steadfast in promoting the advancement of science and technology through a culture of excellence rooted in strong scientific foundations and multidisciplinary expertise. Today, ITB's research and innovation agenda emphasizes the reinforcement of this scientific culture, where quality is placed above quantity.

Research conducted by ITB scholars is increasingly oriented toward high-impact outcomes, with a focus on producing reputable scientific works that contribute meaningfully to global knowledge. These contributions go beyond academic publications to include innovations such as patents. The value lies not merely in output, but in the originality and novelty embedded in each work.

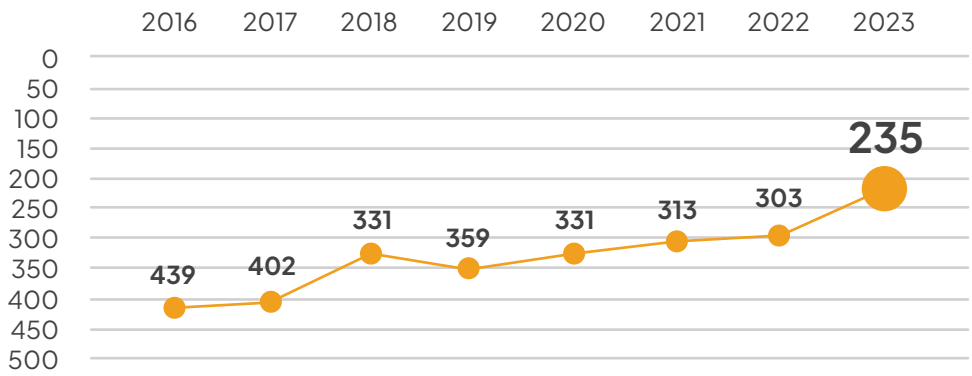
Importantly, ITB's pursuit of scientific excellence is not intended to create an isolated "ivory tower," disconnected from the public. On the contrary, the university is committed to balancing global competitiveness with local relevance. By anchoring its efforts in community needs, ITB seeks to foster innovation that responds to real-world challenges and delivers tangible benefits.

In line with this vision, ITB's research excellence is designed to catalyze the creation of new values, technologies, and solutions with far-reaching impact. Guided by this culture of scientific rigor, ITB scientists are fulfilling their academic mission—Dharma—through research and technological innovations that not only meet international standards but also address pressing societal issues.

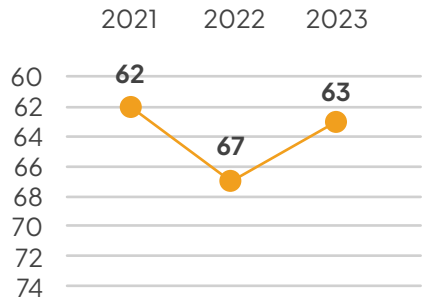
Facts & Figure

QS University Rankings 2023

QS WORLD UNIVERSITY RANKINGS



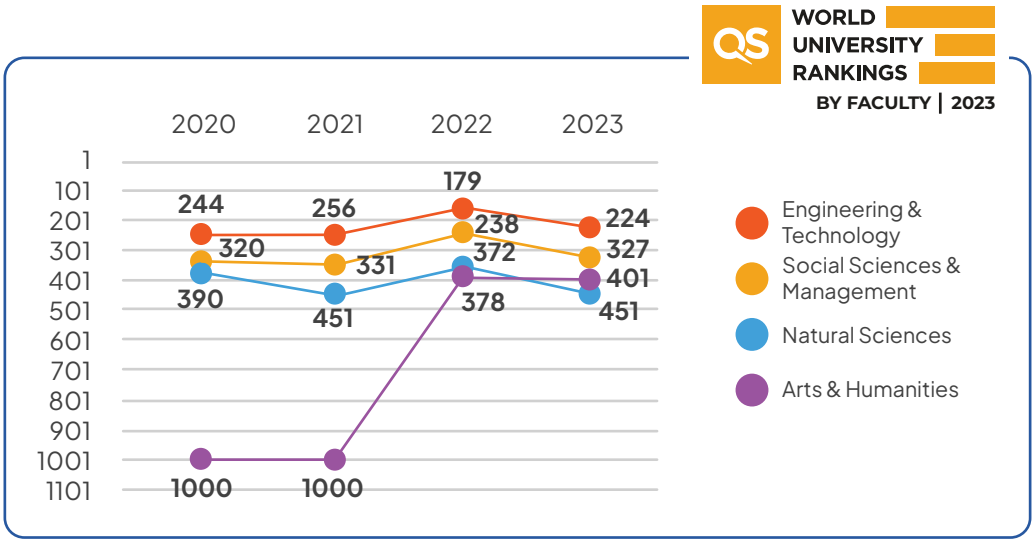
QS ASIAN UNIVERSITY RANKINGS



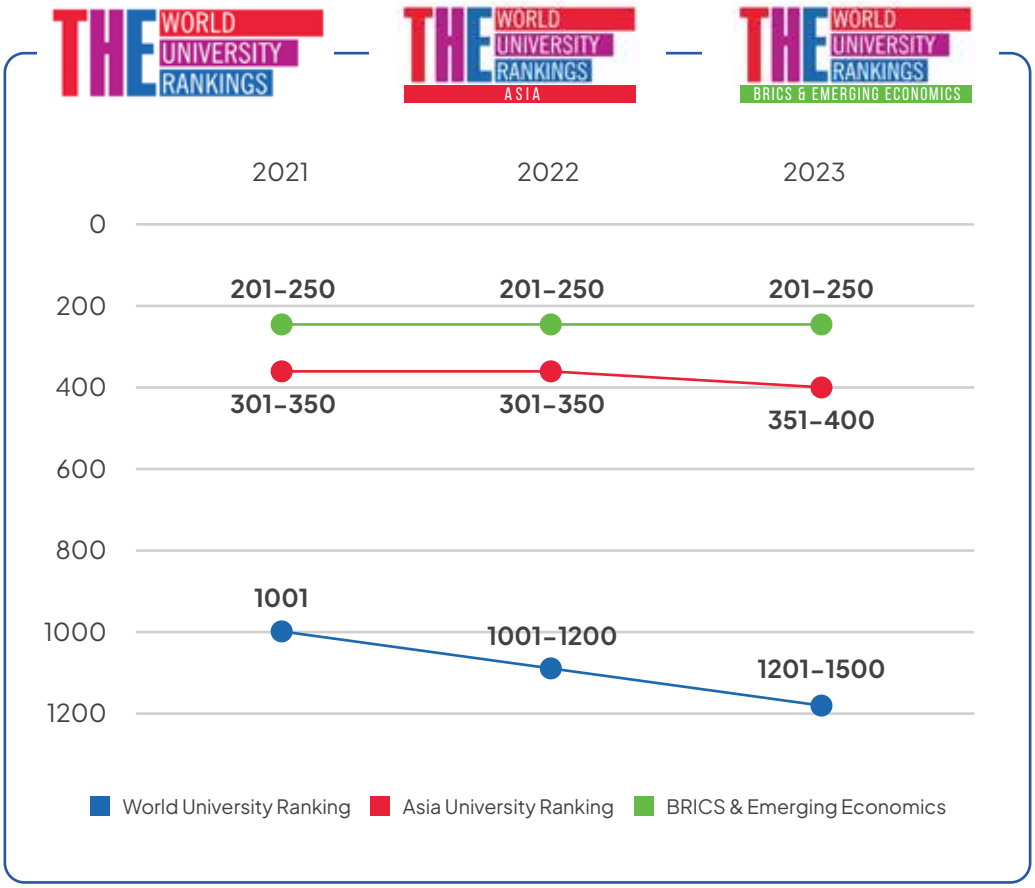
QS WORLD UNIVERSITY RANKINGS

BY SUBJECT | 2023

Broad Subject Areas	*Global Rank*	*Domestic Rank*
Engineering & Technology	**#179** ↑	**#1** –
Natural Sciences	**#372** ↑	**#1** –
Arts & Humanities	**#378** ↑	**#3** ↑
Social Sciences & Management	**#238** ↑	**#4** ↓

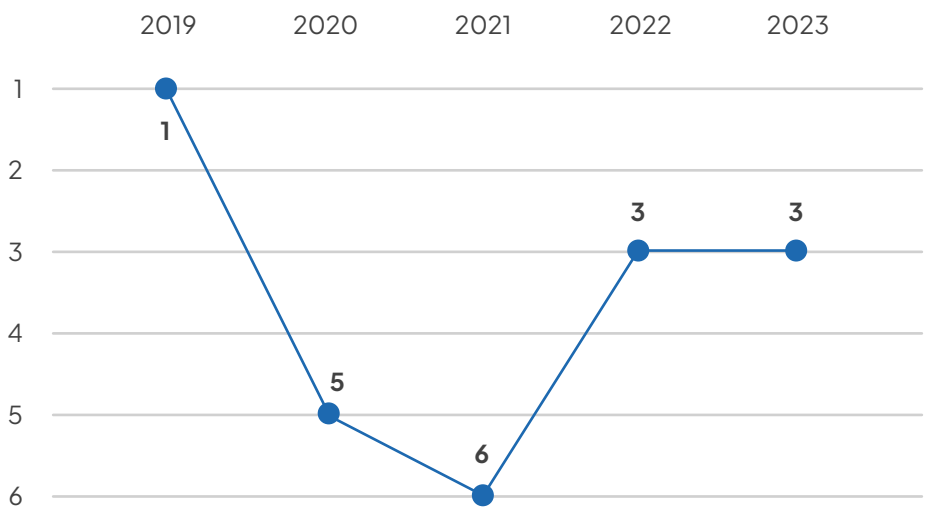


THE University Rankings 2023



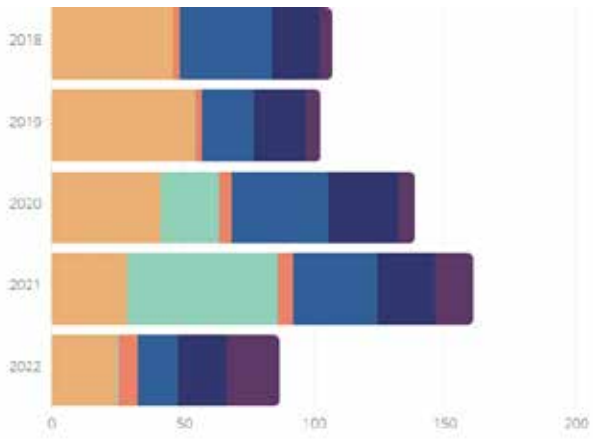
National University Rank by Ministry of Education, Culture, Research, and Technology 2023

KEMENDIKBUDRISTEK
UNIVERSITY RANKING



Research Grants and Publication

Research Funding Source (in Billion IDR)



Rp196 billion
Community Service Collaboration

Rp80.43 billion
Assignment of Community Service Program PM Dirjen Dikti Ristek

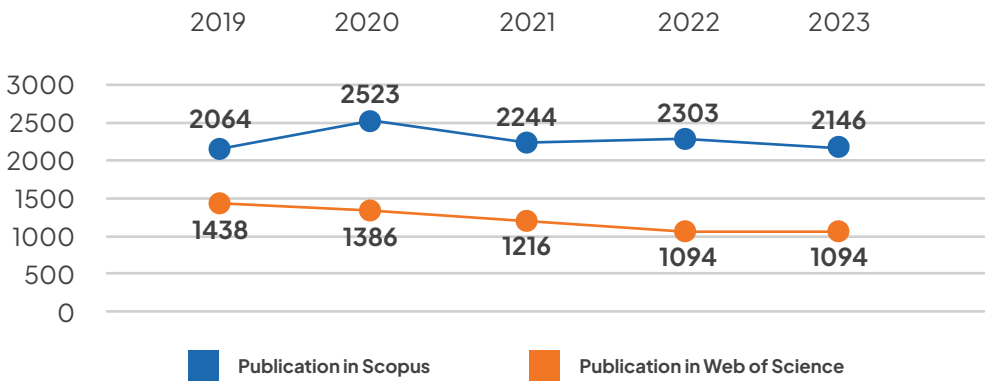
Rp23.47 billion
Assignment of Community Service Program Funding from ITB

Rp139.10 billion
Research Collaboration

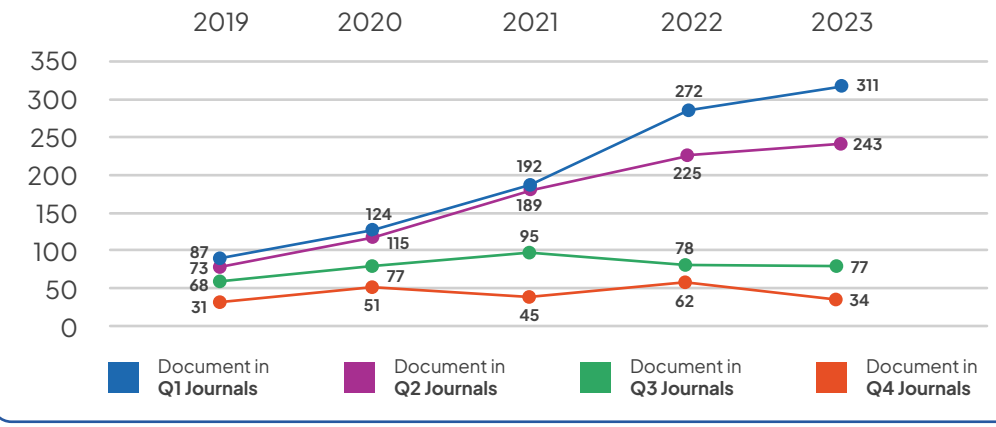
Rp104.61 billion
Assignment of Research Program Dirjen Dikti Ristek/BRIN

Rp51.63 billion
Assignment of Research Program Funding from ITB

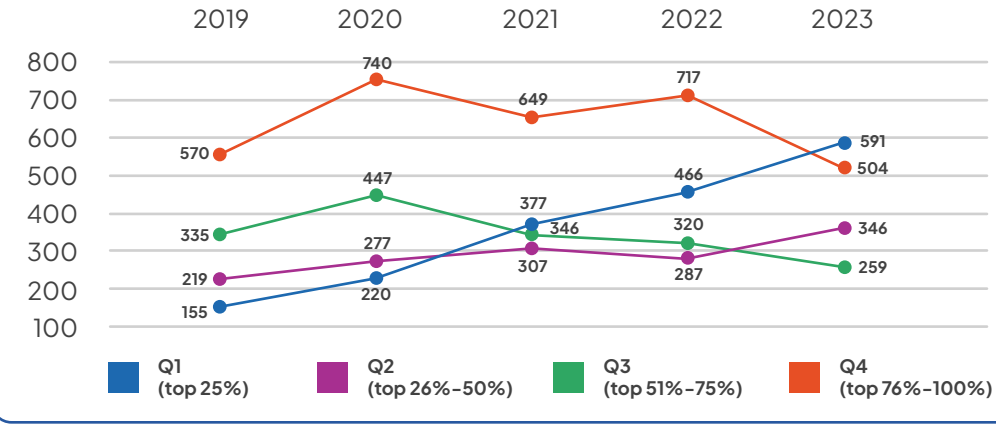
ITB Publication



Quartile Publication - Web of Science



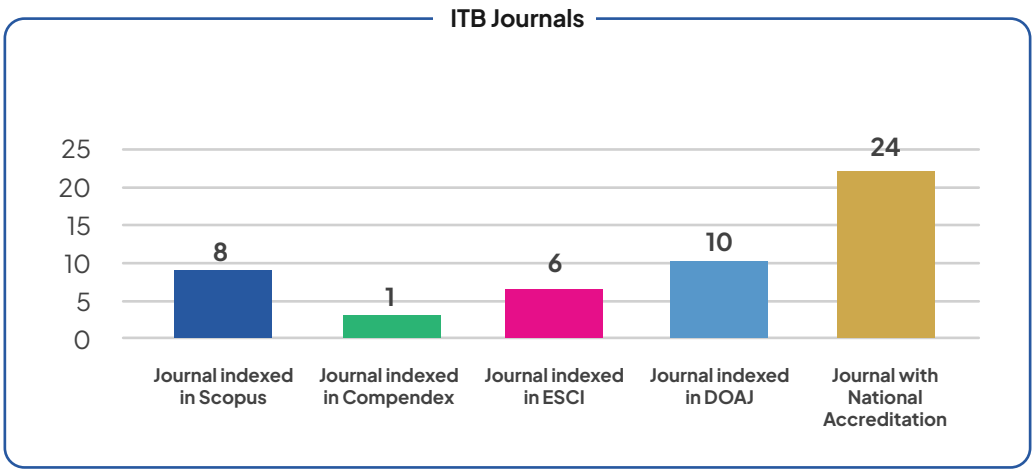
Quartile Publication - Scopus



ITB Research Collaborator

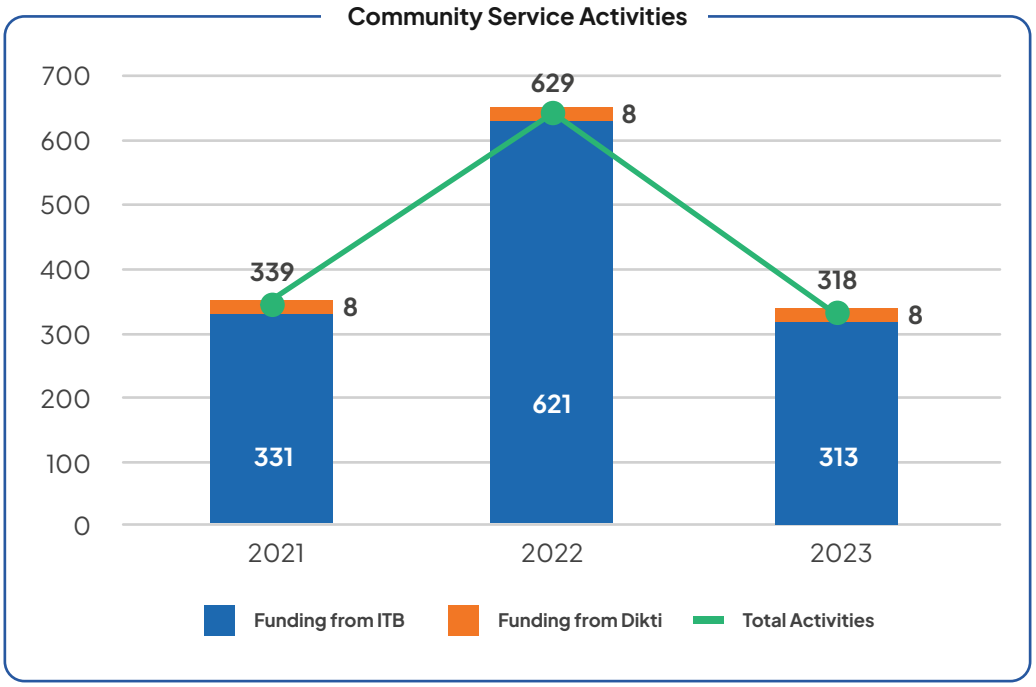
QS World University Rankings 2024	ITB Research Collaborator	Country/ Region	Publications 2019–2023	ITB rank among other Indonesian Partners
1	MIT		12	No 2
2	University of Cambridge		29	No 3
3	University of Oxford		15	No 11
4	Harvard University		8	No 15
5	Stanford University		5	No 11
6	Imperial College London		18	No 8
7	ETH Zurich		10	No 3
8	National University of Singapore		50	No 2
9	University College London		30	No 6
10	University of California at Berkeley		23	No 1
11	University of Chicago		7	No 3
12	University of Pennsylvania		2	No 14
13	Cornell University		2	No 19
14	The University of Melbourne		9	No 16
15	California Institute of Technology		3	No 1
16	Yale University		22	No 4
17	Peking University		3	No 13
18	Princeton University		3	No 2
19	The University of New South Wales		16	No 11
20	The University of Sydney		29	No 5
21	University of Toronto		8	No 11
22	The University of Edinburgh		15	No 9
23	Columbia University		9	No 7
24	Universite PSL		19	No 1
25	Tsinghua University		16	No 5
26	Nanyang Technological University		42	No 2
27	Johns Hopkins University		4	No 18

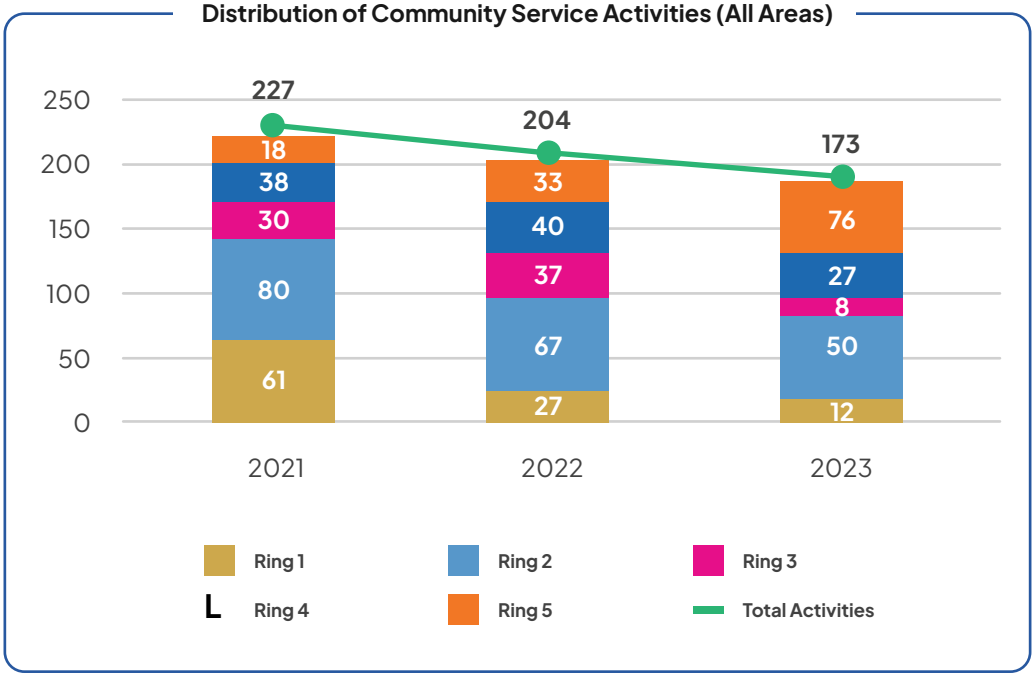
ITB Journals



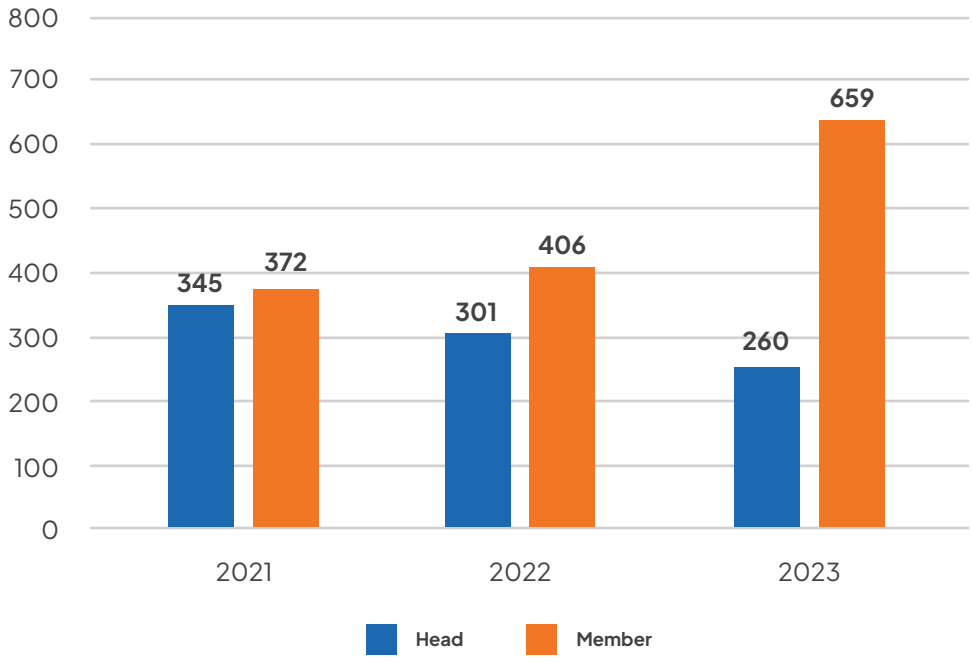
No	Journal	URL
1	Journal of ICT Research and Applications	https://journals.itb.ac.id/index.php/jictra
2	Journal of Engineering and Technological Sciences	https://journals.itb.ac.id/index.php/jets
3	Journal of Regional and City Planning	https://journals.itb.ac.id/index.php/jpwk
4	Journal of Mathematical and Fundamental Sciences	https://journals.itb.ac.id/index.php/jmfs
5	Electronic Journal of Graph Theory and Applications	https://ejgta.org/index.php/ejgta
6	Int. Journal on Electrical Engineering & Informatics	https://ijeei.org/aims.html
7	Journal of Visual Art and Design	https://journals.itb.ac.id/index.php/jvad/index
8	The Asian Journal of Technology Management (AJTM)	https://journal.sbm.itb.ac.id/index.php/ajtm/index
9	Indonesian Journal for The Science of Management	https://journal.sbm.itb.ac.id/index.php/mantek
10	Journal of Civil Engineering	https://journals.itb.ac.id/index.php/jts
11	Communication in Biomathematical Sciences	https://journals.itb.ac.id/index.php/cbms
12	Journal of Sociotechnology	https://journals.itb.ac.id/index.php/sostek
13	Wimba : Journal of Visual Communication	https://journals.itb.ac.id/index.php/wimba
14	Asean Journal on Hospitality and Tourism	https://journals.itb.ac.id/index.php/ajht
15	3Bio: Journal of Biological Science, Technology and Management	https://journals.itb.ac.id/index.php/3bio
16	The Current Research on Biosciences and Biotechnology (CRBB)	https://crbb-journal.com/ojs/index.php/crbb
17	Journal of Ergonomics and K3	http://jurnalergonomik3.ti.itb.ac.id/index.php/ergonomik3
18	Journal of Automation, Control and Instrumentation	https://journals.itb.ac.id/index.php/joki/index
19	International Journal of Sustainable Transportation Technology	https://unijourn.com/journal/ijstt/
20	Bulletin of Geology	https://buletingeologi.com/index.php/buletin-geologi
21	Journal of Sports Science and Health	https://journals.itb.ac.id/index.php/jskk
22	Journal of Environmental Engineering	https://journals.itb.ac.id/index.php/jtl/index
23	Warta Pariwisata	https://journals.itb.ac.id/index.php/wpar

Community Service Programs

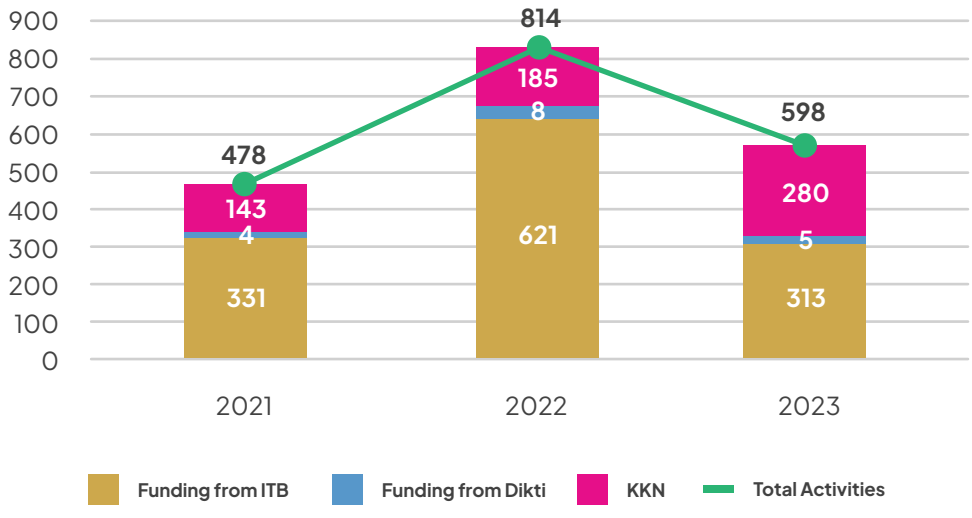




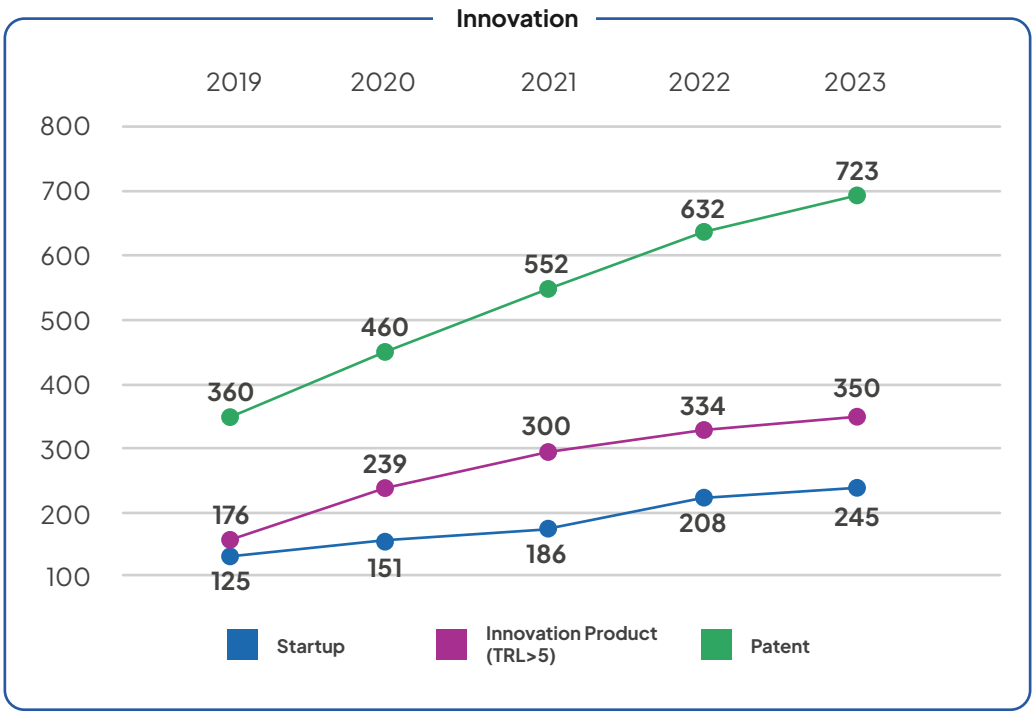
Number of Lecturers and Members of Community Service Activities

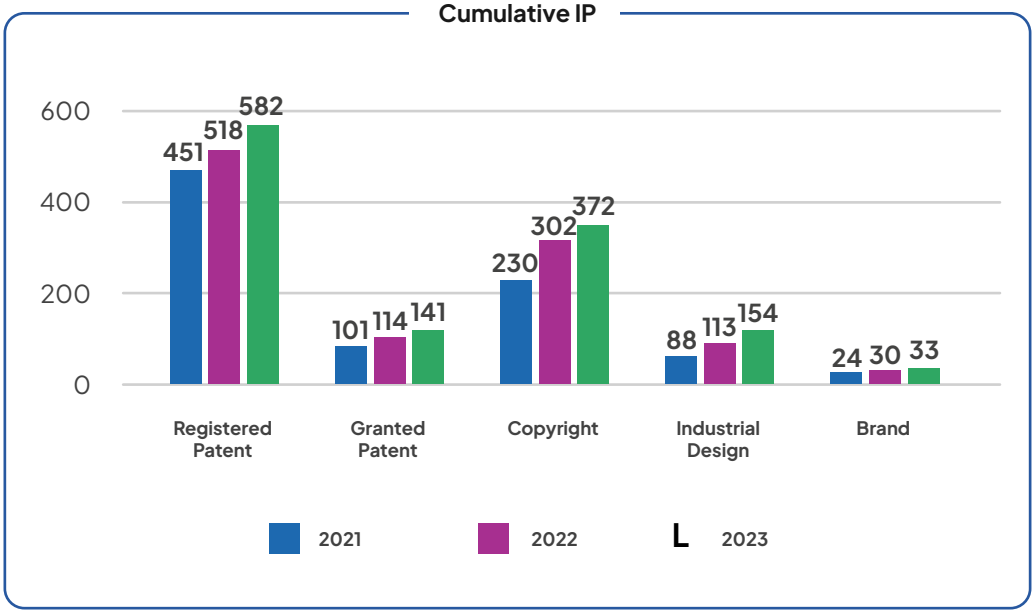


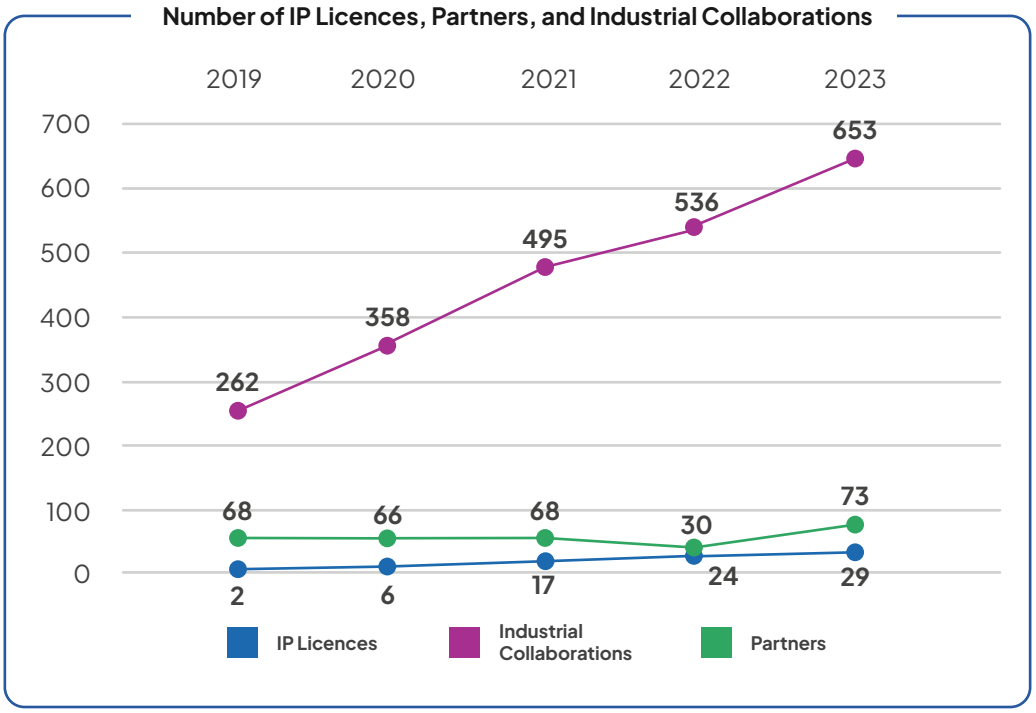
Involvement of MBKM KKN students in Community Service Activities

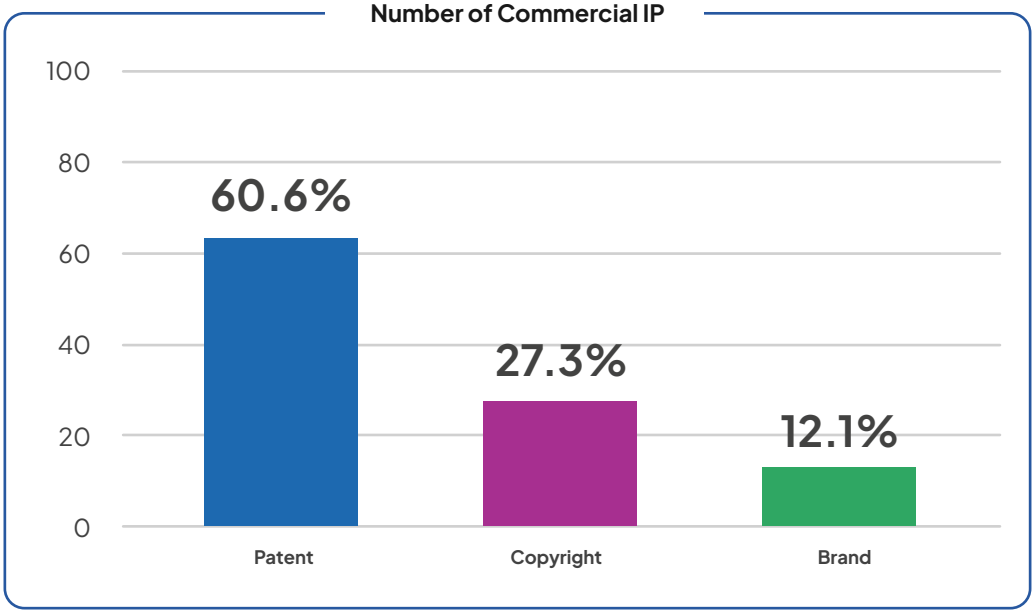


Startup, IP, and Innovation Product






Number of IP Licences, Partners, and Industrial Collaborations
2019
2020
2021
2022
2023
700
600
500
400
300
200
100
0
262
358
495
536
653
68
66
68
30
73
2
6
17
24
29
IP Licences
Industrial Collaborations
Partners


Number of Commercial IP
100
80
60
40
20
0
60.6%
27.3%
12.1%
Patent
Copyright
Brand

Dr. Ir.

Yuli S. Indartono, M.T.

Chairman of LPPM ITB

The Institute for Research and Community Service of Institut Teknologi Bandung (LPPM ITB) was established in late 2001 through Rector's Decree No. 192A/SK/K01/2001/2001. It was formed from the merger of ITB's Research Institute, founded in 1959, and the Institute for Community Service. The establishment of LPPM is part of ITB's strategic initiative to bridge the gap between the capabilities of science, technology, and the arts in higher education, and the real needs and opportunities in society.

LPPM ITB serves as a hub for the academic community to carry out research and community engagement activities in line with the university's threefold mission (Tridharma): education, research, and community service. With solid coordination and adaptive governance, LPPM facilitates research collaborations and community outreach through-studies, mentoring programs, and consultancy services.

LPPM's partnership network extends widely—encompassing national and international research institutions, government agencies, industries, state-owned enterprises, private sectors, and civil society organizations. These collaborations reflect the strong trust placed in LPPM ITB as a strategic partner with proven academic integrity and scientific capacity.

As a supporting unit within ITB, LPPM plays a vital role as facilitator and institutional coordinator for research and community service. It aims to enhance reciprocal synergy between the academic competence of ITB's scholarly community and the needs of society—serving as a meaningful contribution to national development driven by science, technology, and the arts.

Ir.

R. Sugeng Joko Sarwono

M.T., Ph.D.

Director of LPIK ITB

The Institute for Innovation and Entrepreneurship Development at Institut Teknologi Bandung (LPIK ITB) was founded with the vision of fostering a dynamic and sustainable innovation ecosystem within ITB. Built upon the university's core values—Excellence in Teaching, Research, and Innovation—LPIK ITB plays a pivotal role in cultivating an entrepreneurial spirit and advancing impactful innovation across the institution. LPIK ITB leads a wide range of initiatives aimed at translating scientific discoveries into real-world applications. These include managing innovation-focused research, supporting startup development and incubation, facilitating intellectual property (IP) protection, and assisting in the commercialization of research outcomes. To further nurture entrepreneurial culture, the institute also organizes training programs, mentorship schemes, IP awareness campaigns, and innovation showcase activities that promote and document the achievements of ITB's innovators. With a strong commitment to strengthening Indonesia's innovation capacity and creative industries, LPIK ITB strives to leverage the nation's rich natural resources and cultural diversity. As a leading institution in science and technology, ITB recognizes the importance of cultivating a resilient scientific and innovation culture—where research excellence serves as the foundation for high-impact solutions that benefit society at large.

To ensure research outcomes reach their fullest potential, LPIK ITB promotes effective downstreaming strategies—such as the creation of startups and strategic industry partnerships—to enable the adoption and scaling of innovations. In this way, the continuum between research, innovation, and entrepreneurship becomes seamlessly integrated, reinforcing ITB's role as a catalyst for national development and global competitiveness.

Prof. Dr. Ir.
Taufan Marhaendrajana,
M.Sc.

Director of LPIT ITB

The Institute for the Advancement of Science and Technology (LPIT) at Institut Teknologi Bandung (ITB) was officially established on February 1, 2022, under the coordination of the Vice-Rector for Research and Innovation (WRRI). As a key institutional pillar within ITB's research ecosystem, LPIT is tasked with overseeing and advancing the performance of various Research Centers (Pusat dan Pusat Penelitian) and the Science Techno Park (STP). This structure is strategically aligned with ITB's four flagship areas of excellence: Information and Communication Technology, Food and Health, Transportation and Energy, and Regional and Disaster Management.

LPIT serves as a catalyst for interdisciplinary collaboration and scientific innovation at ITB. By fostering synergy among research centers,the institute aims to elevate the quality and relevanceof scientific output—ranging from fundamental research to applied technologies and inventive products. The goal is to produce high-impact solutions that not only address complex national and global challenges but also reinforce ITB's identity as a world-class university with strong local engagement.

At the heart of LPIT's mission is the Science Techno Park (STP)—a dynamic ecosystem designed to bridge the gap between academic research and societal application. STP functions as a launchpad for downstreaming innovations into viable products and services that can be commercialized or scaled for public benefit. Through its integrated facilities and strategic programs, STP brings together researchers, startup founders, industries, investors, and government stakeholders. This collaborative environment supports a full innovation lifecycle that includes incubation, acceleration, co-creation, and co-branding.

Selected Researchers

01 *Dr. Irwan Meilano*

02 *Dr. Arie Wibowo*

03 *Dr. Khoiruddin*

04 *Dr. Rino R. Mukti*

05 *Dr. Heru Purboyo Hidayat*

06 *Prof. Dr. Taufiq Hidajat*

07 *Dr. Pindi Setiawan*

08 *Prof. Satria Bijaksana*

Rollback of "Banda Detachment" Unexpected Historical Earthquakes in The Banda Islands

Dr. Irwan Meilano

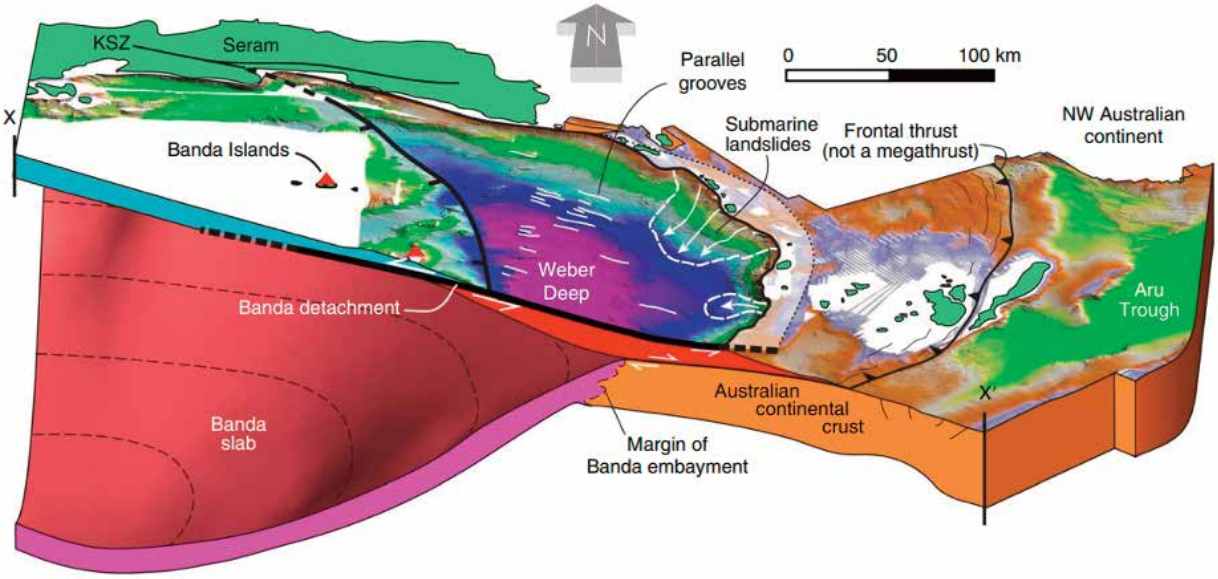
Faculty of Earth Sciences and Technology

Beneath the Banda Sea in eastern Indonesia lies one of the most geologically complex regions in the world. While it was long believed that major earthquakes in the area stemmed from conventional subduction zones, a new study—featuring Irwan Meilano from the Geodesy Research Group, Institut Teknologi Bandung (ITB)—has identified a previously unknown fault system responsible for the devastating 1852 Banda earthquake and tsunami. This fault, named the Banda Detachment, is a low-angle normal fault that changes how scientists understand seismic risks in the region.

The 1852 event, which caused massive destruction and a deadly tsunami in the Banda Islands, had long been attributed to subduction-related megathrust activity. However, historical records and new geophysical modeling suggest otherwise. The study, published in Nature Geoscience, identifies two likely tsunami sources: the Banda Detachment and a submarine landslide side of the Weber Deep. Modeling of both scenarios revealed that the submarine slump closely matches eyewitness accounts from the time.

Unlike the western part of Indonesia, which regularly experiences megathrust earthquakes, the Banda Arc and eastern subduction zones have remained relatively quiet for over a century. This seismic silence raised questions about hidden tectonic mechanisms. The researchers propose that the unique rollback of the subducting slab beneath the Banda Arc has caused extreme stretching of the overlying plate, resulting in the formation of the Banda Detachment—capable of generating large, infrequent earthquakes and tsunamis.

The research offers not only a revised explanation for the 1852 disaster but also a cautionary perspective for the future. Although there has been little recent seismic activity along the Banda Detachment, the fault may still be capable of producing powerful earthquakes.



The absence of recorded quakes should not be mistaken for a lack of risk, especially in a country like Indonesia that is highly vulnerable to natural disasters.

This discovery highlights the importance of reevaluating historical seismic events with modern science. It also emphasizes the need for updated hazard assessments and improved tsunami preparedness in eastern Indonesia. By better understanding faults like the Banda Detachment, scientists and policymakers can work together to reduce risks and protect communities in one of the world's most tectonically active regions.

Selected Researcher 02

3D Printing for Bone Tissue Engineering

Dr. Arie Wibowo

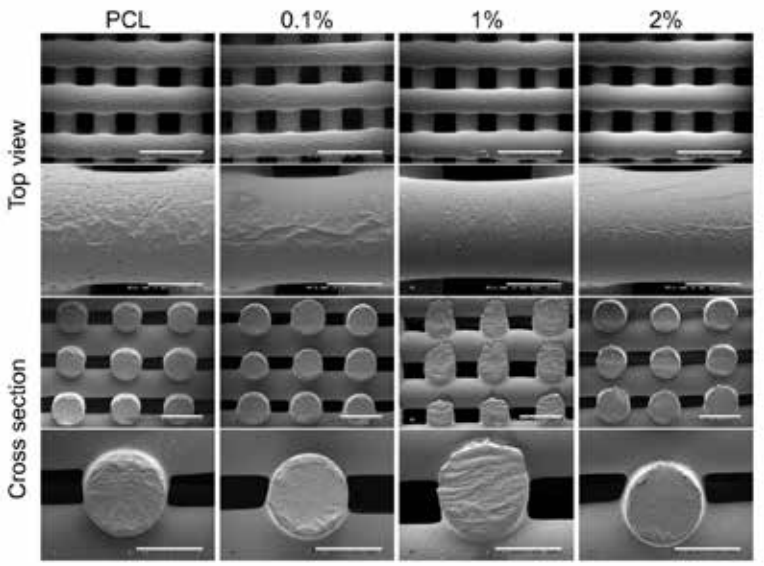
Faculty of Mechanical and Aerospace Engineering

Electroactive scaffolds have gained increasing attention in bone tissue engineering due to the role of electrical signals in cellular behavior. Among conductive polymers, polyaniline (PANI) stands out for its electrical performance; however, its poor biodegradability and potential cytotoxicity limit its direct biomedical applications. To overcome these challenges, researchers have developed composite scaffolds by blending PANI with polycaprolactone (PCL), a well-known biodegradable polymer. This study explores the fabrication and characterization of PCL-PANI scaffolds using screw-assisted 3D printing, aiming to achieve a viable combination of electrical conductivity, mechanical strength, and cellular compatibility.

The synthesis of PANI was performed through oxidative polymerization, followed by wet ball-milling to reduce the particle size to approximately 20 µm—ideal for melt-blending and 3D printing. The resulting PANI particles were blended with PCL at different weight percentages (0.1%, 1%, and 2%) and printed into scaffolds with uniform pore structures. The 3D printing approach allowed for precise control over pore size (~300 µm), a key factor in nutrient exchange and vascularization for bone regeneration.

Scanning Electron Microscopy (SEM) analysis revealed a uniform distribution of PANI particles without noticeable aggregation. The scaffolds maintained high porosity (45–50%) and interconnected pores, ensuring suitability for cellular ingrowth. Mechanically, the scaffolds exhibited increased compressive strength as PANI concentration rose, with the 2% PANI scaffold achieving 7.38 MPa, which falls within the range of cancellous bone strength.

In terms of electrical conductivity, even a small addition of PANI (0.1%) yielded a significant increase, reaching 2.46×10^{-4} S/cm. Interestingly, further increases in PANI content did not result in proportionally higher conductivity, suggesting that the percolation threshold had already been met at low concentrations.



This indicates that minimal PANI loading can effectively impart electroactivity to the scaffold.

Biocompatibility tests using human adipose-derived stem cells (hADSCs) over a 21–day culture period revealed that only the 0.1% PANI scaffold supported high cell viability and sustained proliferation. Scaffolds containing 1% and 2% PANI, despite their superior mechanical and conductive properties, displayed significant cytotoxic effects—likely due to residual dopants or low-molecular-weight byproducts from PANI synthesis.

Proliferation assays (Alamar Blue) confirmed the biocompatibility of the 0.1% PANI scaffold, with enhanced cell growth up to day 14. This performance surpassed that of pure PCL scaffolds. However, higher PANI concentrations resulted in limited cell proliferation followed by decline, reinforcing the concern over PANI's potential toxicity at elevated doses.

The exact mechanism behind the observed cytotoxicity remains unclear, but is suspected to involve dopant leaching or impurities introduced during polymer synthesis. Improved purification of PANI may help reduce these adverse effects in future formulations. These findings emphasize the importance of fine-tuning PANI content to balance functionality and safety in biomedical applications.

In conclusion, this study demonstrates that 3D-printed PCL/PANI scaffolds containing 0.1% PANI offer an optimal trade-off between mechanical strength, electrical performance, and cytocompatibility—key features required for bone tissue engineering. While higher PANI loadings offer mechanical benefits, their biocompatibility must be addressed before clinical translation.

Future research may explore new doping strategies, advanced purification methods, or even the incorporation of bioactive molecules to improve the biocompatibility of conductive scaffolds.

Electrochemical Methods for Water Purification, Ion Separations, and Energy Conversion

Dr. Khoiruddin

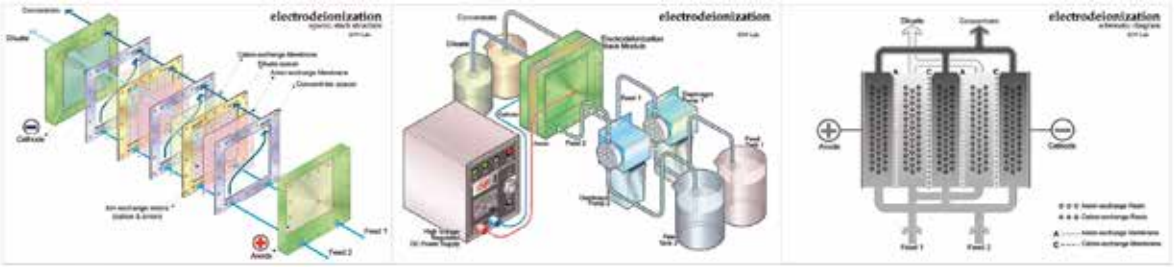
Faculty of Industrial Technology

Environmental pollution has intensified with global industrialization, agricultural expansion, and population growth. One of the most pressing issues is the rising scarcity of clean water, affecting nearly 4 billion people worldwide. Traditional water treatment technologies are struggling to meet increasingly strict environmental standards, prompting researchers to explore more sustainable and efficient alternatives. Among these, electrochemical methods have gained attention for their ability to purify water, separate ions, and convert energy, all while offering compact systems, chemical selectivity, and minimal waste production.

Unlike conventional technologies that extract water from contaminants, electrochemical methods remove contaminants directly from water—allowing for more effective elimination of trace pollutants. A key example is electrodialysis, which utilizes electric potential to move ions through charged membranes, separating them from water-without the need for high pressure or phase change. This makes it energy-efficient and ideal for decentralized applications, especially in remote or resource-limited regions where reverse osmosis may be too costly or complex.

At Institut Teknologi Bandung (ITB), researchers have taken this further by developing conductive electrodialysis, also known as electrodeionization, since 1998. This method integrates ion exchange with electrodialysis to achieve higher conductivity and purify water to an ultrapure level. Such water is essential in industries like pharmaceuticals, semiconductors, and power generation. Compared to traditional electrodialysis, electrodeionization offers reduced energy consumption, especially when applied to seawater desalination.

While effective in high-salinity environments, electrodialysis becomes inefficient as salinity decreases, since energy is wasted on side reactions rather than ion-



transport. To address this, ITB's innovation in electrodeionization aims to maintain high performance even when treating lower salinity water, extending its potential beyond conventional desalination.

ITB's longstanding research was recently featured in the prestigious journal Chemical Reviews, in collaboration with the Massachusetts Institute of Technology (MIT). Through the MIT-Indonesia Research Alliance (MIRA), ITB and MIT have developed joint efforts in membrane technology for water treatment. A chance meeting between Prof. Wenten (ITB) and Prof. Martin Z. Bazant (MIT), who was working on shock electrodialysis, led to fruitful collaboration—merging the strengths of both research teams working on different variations of electrochemical desalination. This partnership has produced multiple joint publications, not only in Chemical Reviews but also in Advances in Colloid and Interface Science, and more recently in Chemical Engineering and Processing – Process Intensification. Together, these works demonstrate the promising future of electrochemical methods in water purification, offering scalable, efficient, and energy-conscious solutions to address the global water crisis—particularly in regions most in need of decentralized, sustainable technologies.

Preparation of Nanosized SSZ-13 Zeolite with Enhanced Hydrothermal Stability by a two-stage Synthetic Method

Dr. Rino R. Mukti

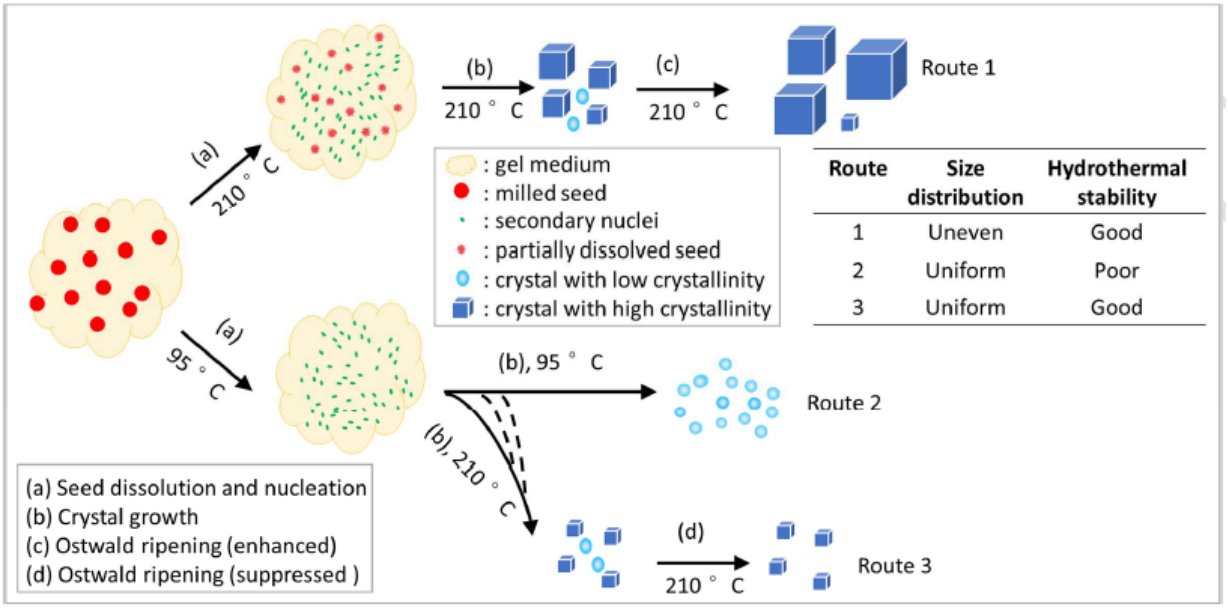
Faculty of Mathematics and Natural Sciences

Zeolites, known for their crystalline microporous structures, play vital roles in catalysis, adsorption, and ion exchange. Among them, SSZ-13 zeolite—due to its CHA topology—is particularly effective in selective catalytic reduction of NOx using ammonia (NH_3-SCR) and methanol-to-olefins (MTO) reactions. However, when synthesized at nanoscale for improved diffusion and activity, SSZ-13 tends to suffer from poor hydrothermal stability. Addressing this challenge, a team of researchers developed a two-stage synthetic method that successfully enhances both the stability and catalytic performance of nanosized SSZ-13.

The method involves an initial low-temperature crystallization stage at 95°C followed by a high-temperature treatment at 210°C. By adjusting the duration of each stage, the researchers were able to tune the particle size between 50–300 nm.

The high-temperature stage proved critical not only for accelerating crystal growth but also for healing structural defects that commonly weaken hydrothermal resistance in nanosized zeolites. This process enables faster synthesis compared to conventional methods that typically take several days.

Crucially, SSZ-13 synthesized using this two-step method (referred to as TS-SSZ-13) retained up to 80% crystallinity and microporosity even after exposure to 800°C in humid air, a benchmark condition for industrial stability. In comparison, conventionally prepared nanosized SSZ-13 retained only around 60% under the same conditions. These findings confirm the significant impact of high-temperature post-treatment in reinforcing the internal framework and enhancing thermal durability.



Route	Size distribution	Hydrothermal stability
1	Uneven	Good
2	Uniform	Poor
3	Uniform	Good

Advanced characterization techniques, including XRD, SEM, 27Al SSNMR, and high-energy X-ray total scattering (HEXTS), showed that the improved samples had better atomic ordering and fewer defects. In particular, 27Al SSNMR confirmed the prevalence of tetrahedrally coordinated aluminum—an indicator of good zeolite framework integrity—after the high-temperature stage. HEXTS data further supported the structural healing effect.

The two-stage SSZ-13 samples were also tested in NH_3-SCR catalytic performance. After hydrothermal aging at 800°C, the two-stage nanosized zeolite maintained high NOx conversion, comparable to raw, micron-sized SSZ-13.

This highlights the method's potential not only for producing robust zeolites but also for improving long-term catalyst durability in real-world applications.

In conclusion, this research offers a facile, scalable approach to produce hydrothermally stable nanosized zeolites using time- and temperature-controlled crystallization. With strong implications for industrial catalysis, particularly in emissions control and energy-efficient chemical production, the two-stage method stands out as a promising strategy for next-generation zeolite synthesis.

Applying Knowledge, Social Concern and Perceived Risk in Planned Behavior Theory for Tourism in the COVID-19 Pandemic

Dr. Heru Purboyo Hidayat Putro

School of Architecture, Planning and Policy Development

The COVID-19 pandemic drastically changed human mobility and impacted global tourism. With governments enforcing physical distancing and travel restrictions, individuals were forced to reconsider travel plans amid growing uncertainty and perceived health risks. This study extends the Theory of Planned Behavior (TPB) by integrating three key variables—knowledge, social concern, and perceived risk—to better understand tourists' decision-making during the pandemic, specifically in the Indonesian context.

Using data collected from over 1,000 respondents across 34 provinces in Indonesia, the researchers applied partial least squares structural equation modeling (PLS-SEM) to assess how different internal and external factors influence an individual's intention to travel. Findings show that subjective norm—the perceived social pressure from family, friends, and government—had a stronger influence on travel intentions than personal attitudes or perceived behavioral control. This aligns with the characteristics of collectivist societies, where group consensus often outweighs individual judgment.

The study found that knowledge uncertainty and inadequate information about COVID-19 reduced individuals' perceived risk. This, in turn, weakened self-control over physical distancing and increased travel intentions. On the contrary, individuals with higher knowledge levels about the virus were more likely to perceive greater risks and adopt protective attitudes such as avoiding non-essential travel. These findings highlight the critical role of clear, consistent information dissemination in shaping responsible travel behavior.

In addition to knowledge, social concern—defined as empathy and responsibility toward the well-being of others—significantly influenced travel behavior. Individuals with higher social concern showed stronger attitudes toward following health protocols and avoiding actions that might endanger others. This adds a moral and communal dimension to behavior during a public health crisis and suggests that appeals to social responsibility can be effective in tourism messaging.

The study also found that perceived risk not only directly affected travel intentions but also strengthened self-efficacy and perceived control over travel decisions.

This indicates that tourists who feel more at risk are more likely to exercise self-restraint and comply with safety guidelines.

Interestingly, while attitude and perceived control influence travel intentions, the most substantial predictor remained the influence of close social groups.

Overall, the extended TPB model explained nearly 70% of travel intention variance, demonstrating its effectiveness in analyzing tourist behavior during crises. The study offers practical recommendations for tourism planners and governments: emphasize transparent communication, reinforce social norms around safe behavior, and design policies that reflect community values. As the tourism industry adapts to future health-related disruptions, understanding the psychological and social drivers of behavior becomes increasingly essential.

Selected Researcher 06

Hints of Life on Titan

Prof. Dr. Taufiq Hidajat

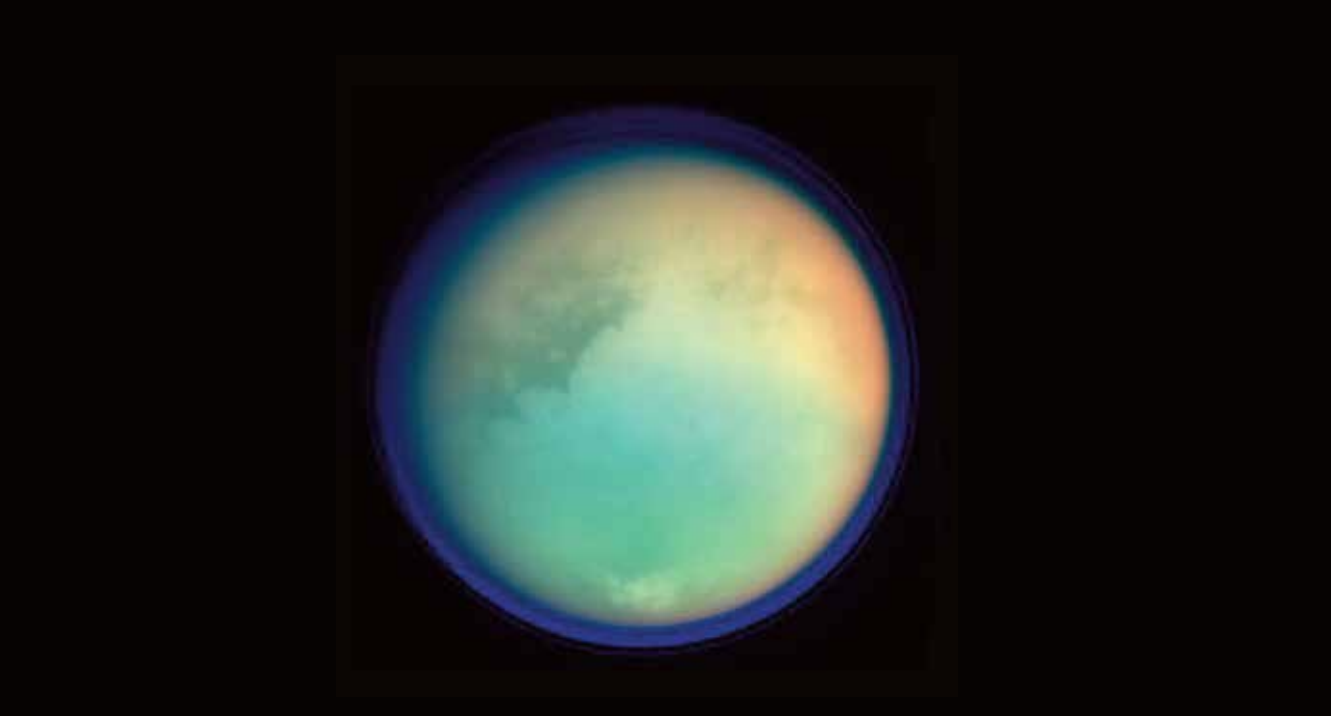
Faculty of Mathematics and Natural Sciences

Titan, one of Saturn's largest moons, has revealed a surprising atmospheric phenomenon: a high-speed wind jet in its upper thermosphere, at altitudes exceeding 900 kilometers. This discovery was made using the Atacama Large Millimeter/submillimeter Array (ALMA), a world-class radio telescope, providing new insights that were not captured by the Cassini spacecraft, which extensively studied Titan from 2005 to 2017. While Cassini conducted numerous flybys of Titan, it failed to detect this strong thermospheric jet, highlighting ALMA's critical role in advancing our understanding of Titan's complex atmospheric dynamics.

Prior to the Cassini mission, researchers had already observed mesospheric winds on Titan, which demonstrated superrotation—winds moving faster than the moon's rotation. ALMA's observations have extended this understanding by showing that these strong prograde winds persist into Titan's thermosphere, intensifying into an equatorial jet that can-reach speeds up to 340 meters per second at 1,000 kilometers altitude. The origin of these winds is thought to be related to atmospheric waves generated in the stratosphere and mesosphere or interactions between Titan's ionosphere and Saturn's magnetosphere.

This thermospheric jet discovery adds complexity to Titan's atmospheric behavior, as its speed and conditions fluctuate rapidly. Titan's atmosphere, thicker and more chemically rich than that of Earth's moon, contains many organic molecules, making it a natural chemical factory. Unique energy molecules form high in the atmosphere and are transported downward, contributing to processes that resemble a primitive Earth-like environment with methane and ethane lakes on the surface.

Titan's thick, chemically diverse atmosphere is especially significant because it offers a rare glimpse into the kind of environment that might have existed on early Earth before life appeared.



Unlike many other large moons in the solar system, such as those orbiting Jupiter which lack substantial atmospheres, Titan's atmosphere allows scientists to study the chemical pathways that might lead to life. Understanding Titan thus helps scientists piece together Earth's early atmospheric conditions.

The use of ALMA represents a breakthrough in studying celestial bodies without relying solely on costly and complex spacecraft missions. ALMA's high-frequency radio observations detect molecular emissions in Titan's atmosphere, allowing researchers to measure wind speeds and chemical distributions remotely. This method complements data from spacecraft probes, filling in gaps and providing a broader picture of atmospheric dynamics.

Professor Taufiq Hidajat, part of the research team, emphasized his longstanding interest in organic molecules and the search for "molecules of life."

His work, spanning decades, leverages radio telescope technology to study organic compounds such as methane, hydrogen cyanide, and carbon monoxide, which play roles in complex chemical reactions that might lead to life. The search also extends beyond Titan to star-forming regions and interstellar clouds, where organic molecules abound.

Ultimately, Titan stands out as a compelling target in the quest to understand the origins of life. Alongside comets and other rich celestial bodies, Titan's chemically active atmosphere provides clues about the organic chemistry present in the early solar system and the potential for life elsewhere. The discoveries enabled by ALMA are paving the way for future investigations into these fundamental questions.

Selected Researcher 07

Surgical Amputation of a Limb 31.000 years ago in Borneo

(late) Dr. Pindi Setiawan

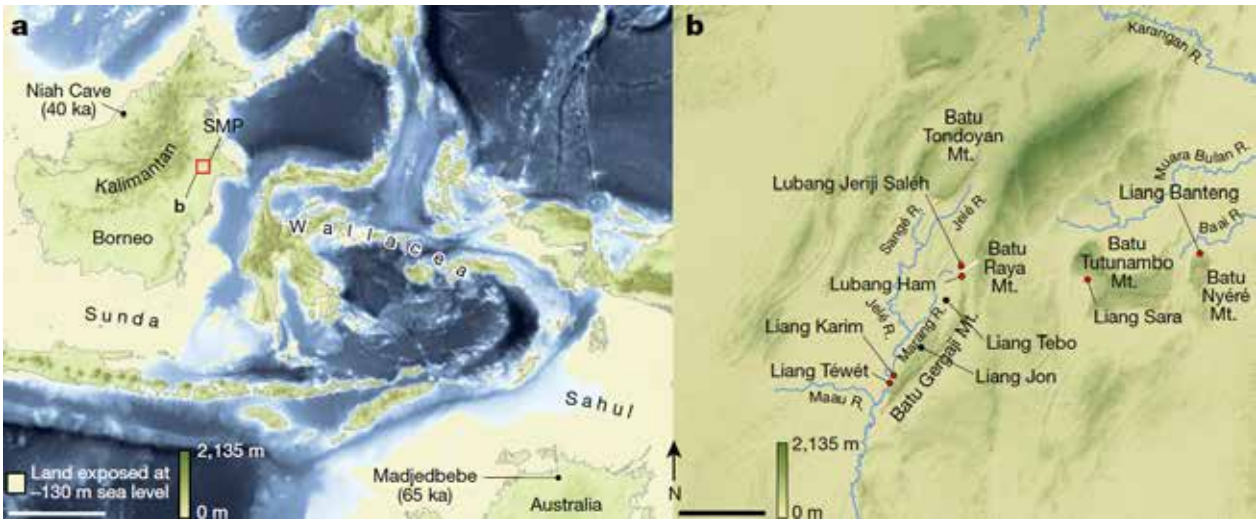
Faculty of Art and Design

A team of archaeologists has uncovered the earliest known evidence of a successful surgical amputation in human history—dating back around 31,000 years. Found in Liang Tebo cave, East Kalimantan (Borneo, Indonesia), the remains belong to a young adult, referred to as TB1, who had the lower third of their left leg surgically amputated during childhood and survived the procedure for 6 to 9 years. This discovery predates the previous oldest known surgical amputation by over 20,000 years and challenges prevailing assumptions about the medical capabilities of prehistoric foraging societies.

The excavation site, Liang Tebo, lies within a limestone karst region rich in archaeological features, including some of the world's oldest known rock art. The TB1 burial was deliberate and marked, with stones placed around the head and arms and the body positioned with care. Radiocarbon and electron spin resonance dating confirm the burial occurred between 31,000 and 30,000 years ago—making TB1 the oldest documented case of intentional limb surgery and burial in Island Southeast Asia.

Detailed analysis of TB1's skeleton revealed a healed amputation of the left lower leg, with clean oblique bone cuts and signs of bone remodeling. The lack of infection, crushing injuries, or trauma indicative of accidents or animal attacks strongly suggests the use of surgical tools and post-operative care. The right leg, in contrast, was fully intact, reinforcing the interpretation of deliberate surgical intervention.

This evidence contradicts the long-standing belief that complex medical procedures, including amputations, only arose after the advent of agriculture during the Neolithic era.



The successful operation on TB1 required not only anatomical knowledge but also the ability to control bleeding, prevent infection, and provide long-term care—indicating a level of medical sophistication not previously attributed to foraging communities.

The survival of TB1 after the amputation also implies that the community provided significant care and support. Life with a severe disability in a rugged tropical environment would have required adaptation and collective assistance. This challenges modern assumptions about social dynamics in prehistoric societies, revealing an advanced sense of empathy and responsibility.

Researchers believe this level of medical knowledge likely developed over generations through trial and error and was preserved through oral tradition. The unique tropical environment of Borneo may have accelerated medical innovation due to high risks of infection, prompting the early use of medicinal plants for antiseptic and anesthetic purposes.

In conclusion, the case of TB1 forces a re-evaluation of the capabilities of early Homo sapiens and suggests that complex surgical procedures may have been more common—and more successful—than previously believed. It also highlights the potential for early rainforest-dwelling communities to independently develop sophisticated healthcare practices long before the emergence of large, sedentary civilizations.

Selected Researcher 08

Uncovering The Secrets of Ancient Climates in The Stunning Lake Towuti

Prof. Satria Bijaksana

Faculty of Mining and Petroleum Engineering

Researchers studied sediments from Lake Towuti, Indonesia, to understand how organic matter broke down in ancient, iron-rich (ferruginous) environments similar to those of Earth's early oceans. These sediments are rich in reactive iron minerals and organic carbon. By analyzing how organic matter is decomposed in these conditions, the study offers new insights into biogeochemical cycles during the Archaean and Proterozoic Eons—periods long before the rise of atmospheric oxygen.

The team found that despite the abundance of reactive iron, methanogenesis—a microbial process that produces methane—was the dominant pathway of organic matter mineralization in the lake's sediment. Surprisingly, iron reduction and sulfate reduction, two other common microbial respiration processes, played only minor roles. This contradicts the expectation that iron reduction should outcompete methanogenesis when iron is abundant.

Methane production occurred throughout the sediment column, and modeling showed that over 85% of organic carbon degradation happened through methanogenesis. There was negligible anaerobic oxidation of methane (AOM), which in modern oceans prevents methane from escaping into the atmosphere. In Lake Towuti, however, methane can diffuse from sediments to the overlying water and potentially reach the atmosphere, suggesting that similar processes could have influenced ancient climates through greenhouse gas emissions.

The study also examined the stability of various iron minerals in the sediment. Despite their theoretical reactivity, minerals like goethite and hematite remained largely unaltered, indicating that these iron phases are more stable in natural settings than lab experiments suggest. This stability might be due to the crystallinity of the minerals or passivation effects from iron(II) ions.

Lake Towuti serves as a modern analog for the ferruginous oceans of early Earth. Since the same types of iron-rich sediments were widespread during that time, the dominance of methanogenesis in Lake Towuti suggests that ancient ocean sediments may have released significant amounts of methane into the atmosphere, influencing early Earth's climate.

The findings also have implications for how we interpret banded iron formations (BIFs) in the geological record. These formations often preserve large amounts of ferric iron, suggesting that much of the iron deposited in ancient oceans was not respired by microbes.

The extent of iron mineral reactivity may have determined how much organic carbon was buried versus converted into methane.

In conclusion, Lake Towuti provides a window into the past, showing how microbial activity in ferruginous environments can affect carbon cycling and greenhouse gas production. These insights are vital for reconstructing the climate and atmosphere of early Earth and understanding the role of microbial processes in shaping planetary environments.

Selected Community Services

01 *Dr. Allis Nurdini*

02 *Akhmad Zainal A., Ph.D.*

03 *Dr. Aos*

04 *Prof. Lienda Aliwarga*

05 *Dr. Ir. Suyatman*

Sustainable and Affordable Housing for All

Dr. Allis Nurdini

School of Architecture, Planning and Policy Development

Owning a home has become increasingly difficult, especially in urban areas where land is limited and prices are high. As urban housing sprawls into rural areas, environmental considerations often take a back seat. Residential development is now one of the largest contributors to carbon emissions, not only from construction but also from material production and transportation. In response, Dr. Allis Nurdini from Institut Teknologi Bandung (ITB) has developed a sustainable housing model suitable for rural areas, aimed at being environmentally friendly, socially inclusive, and economically feasible.

This community outreach project took place in Pangasenan Hamlet, Sumedang, West Java. It transformed an existing toilet facility into a multipurpose space, integrating it into a research house. he approach emphasized the use of local resources—from labor and materials to construction techniques—without sacrificing agricultural land. This context-sensitive method demonstrates how environmentally friendly housing can adapt to both urban and rural settings through revitalizing underutilized buildings or spaces.

The house uses locally available materials like gmelina wood and woven bamboo. The wood was harvested and processed by local craftsmen, enhancing community skills and reducing transport emissions. Despite using local materials, the house is not rudimentary—technological interventions allow these resources to be transformed into functional and aesthetic structures. The house design also includes a vertical expansion over existing facilities, maximizing land use efficiency.

Environmental features are deeply embedded in the structure. A sanitation system filters greywater through phytoremediation, which is then reused for fish ponds.

Rainwater harvesting systems and biogas installations using local cattle waste further support sustainability. These systems were developed with the involvement of ITB researchers in biorefinery and geotechnics, ensuring the building serves as a fully functional, eco-friendly space for visiting researchers.

While rooted in local wisdom, the bamboo-walled, stilted design may seem outdated to some communities, who are now more influenced by urban housing trends like concrete walls and lightweight steel. These perceptions can hinder acceptance, even though materials like wood are more sustainable. Researchers emphasize the importance of reviving interest in renewable materials and construction techniques through education and technological innovation.

The project showcases that sustainable housing can be achieved incrementally—building in stages to match financial capabilities. This model is ideal for low-income communities and contrasts with conventional developer-led housing that demands large upfront investment. Incremental building, once common in Indonesian housing, allows homeowners to expand their homes over time, reducing costs and making housing more accessible.

This participatory approach not only empowers residents with construction skills and knowledge, but also promotes local partnerships. It aligns with Sustainable Development Goals (SDGs) by fostering inclusive, environmentally responsible development. With proper support, incremental and environmentally conscious housing can become a scalable solution to address the housing crisis while reducing carbon footprints.

Masaro: Turning Waste into Economic and Environmental Wealth

Akhmad Zainal Abidin, Ph.D.

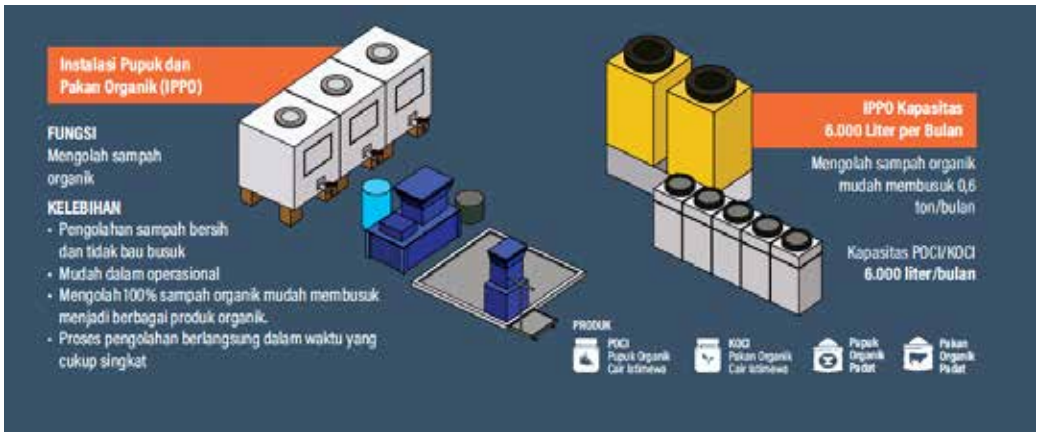
Faculty of Industrial Technology

Waste is often associated with filth, bad odors, and visual pollution. In most cases, it's simply moved from households to landfills without real processing. Yet, waste—especially when properly sorted—can have significant economic value. Sustainable waste management supports multiple Sustainable Development Goals (SDGs), such as responsible consumption and production (SDG 12), clean energy (SDG 7), and life on land (SDG 15). Organic waste forms the majority of household waste—around 50% to 70%—and its poor management leads to environmental and health hazards.

To address this, ITB researcher Ir. Akhmad Zainal Abidin, M.Sc., Ph.D., developed Masaro—short for Manajemen Sampah Zero (Zero Waste Management). Unlike conventional disposal methods, Masaro ensures that all waste can be processed locally without generating residue. Waste must first be sorted into biodegradable and non-biodegradable categories. This method allows waste to be turned into valuable products rather than ending up in landfills.

Organic waste is divided further into easily decomposable (like food scraps) and slow-decomposing (like wood and leaves). The Masaro system converts food scraps into POCI (Premium Organic Compost Liquid) and KOCI (Premium Organic Feed Liquid), which are used in agriculture and livestock. For harder organic waste, such as dry leaves, the system produces compost and planting media. With innovative fermentation and catalysis techniques, one kilogram of waste can produce 12 liters of liquid fertilizer or feed, with a market value equivalent to one gram of gold.

Masaro installations, including IPPO and IPSA units, are designed to be odor-free and suitable for residential areas.



The system is cost-effective compared to traditional landfill methods. While initial investment is around Rp 3.5 billion, monthly returns from selling POCI, KOCI, compost, and organic pesticides can reach Rp 3.9 billion. In just two years, the investment can be recovered. These installations can be managed communally, involving local governments, villages, and BUMDes (village-owned enterprises).

Masaro has been implemented across Indonesia—from Bali and Cirebon to Sukabumi and Gorontalo. However, its success is sometimes hindered by policy resistance, as it shifts the outdated "collect-transport-dispose" paradigm into a "sort-process-sell" model. This new approach redefines waste as a source of income, not just a responsibility. The key lies in proper waste segregation—only sorted waste can be transformed into valuable assets.

One notable success is in Babakan Village, Cirebon, which faces high waste pressure from 69 schools, 72 Islamic boarding schools, and over 1,400 households. Here, Masaro introduced Polybag Farming—a method of urban agriculture using a specific 4:3:2:1 mixture of soil, organic waste, animal manure, and husk charcoal. This method allows each student to manage 15 polybags of vegetables like tomatoes, eggplants, and chilies—providing food and reducing waste simultaneously.

Masaro products have also proven effective in broader agriculture. In Tinumpuk Village, Indramayu, rice crops treated with POCI matured faster and resisted pests better than conventionally grown crops. POCI also acts as a natural pesticide and rodent repellent. Trials on crops like corn, coffee, and even oil palm suggest that Masaro can improve yields while maintaining soil health—an especially promising prospect given current challenges in chemical fertilizer supply.

Livestock and fish farming also benefit. In Bandung Barat, cows fed with KOCI gained 30-45 kg monthly at minimal cost. Goats in Cicalengka and chickens in Ciamis showed improved growth and appetite, while fish farmers in Gorontalo successfully used chemical-free feed. These compelling results demonstrate Masaro's vast potential for expanding sustainable agriculture and creating economic opportunities—turning what was once waste into widespread community benefits.

Maratua: Preserving Paradise through Innovation

Dr. Aos

School of Life Sciences and Technology

Maratua Island, located in East Kalimantan's Berau Regency, is renowned for its stunning marine tourism—home to sea turtles, vibrant coral reefs, dolphins, and clear turquoise waters. However, this natural beauty masks significant challenges. The island's karst terrain makes traditional agriculture nearly impossible, requiring all vegetables to be imported from mainland Kalimantan. Moreover, increasing tourism generates organic waste that threatens marine life, particularly sea turtles. To address these issues, researchers from the Bandung Institute of Technology (ITB) introduced hydroponic farming and waste management using black soldier fly (BSF) bioconversion.

Administratively part of the Maratua subdistrict, the island spans about 384 km² of land and over 3,700 km² of ocean. Tourism has surged since 2015, with sites like Halo Tabung Cave attracting hundreds of visitors each weekend. This boom shifted local livelihoods—many residents transitioned from fishing and coconut farming to working in the tourism sector. However, infrastructure and environmental awareness have struggled to keep pace, especially in waste management.

Youth in Maratua have responded by forming an environmental group, Maratua Peduli Lingkungan (Maratua Environmental Concern). Primarily composed of fishermen and tour operators, the group focuses on coral reef restoration, beach cleanups, and community education about proper waste disposal. Improper waste management—including dumping into the sea—has damaged coral ecosystems and threatens endangered sea turtles, which mistake plastic waste for food.

In 2021, ITB's School of Life Sciences and Technology (SITH) launched a multi-year community engagement project in Kampung Payung-Payung, Maratua. Their goals: reduce organic waste using BSF larvae and promote hydroponic gardening for food resilience. BSF larvae efficiently convert organic waste into high-protein feed for chickens and fish, while residual waste-

becomes organic fertilizer. ITB's team trained residents—including tourism groups—on BSF cultivation and its benefits.

The BSF initiative quickly gained traction. Residents built a small BSF rearing facility and began recycling waste from local shops and restaurants. Some, like Pak Hamri, repurposed their fishing byproducts to feed the larvae and used the resulting maggots to accelerate chicken growth. The program not only tackled Maratua's waste crisis but also offered a low-cost, sustainable alternative to imported livestock feed.

In tandem with BSF, ITB introduced hydroponic gardening to address the island's limited arable land. By growing vegetables in controlled environments, locals could reduce their dependence on external food supplies and generate income by selling fresh produce to the island's growing number of hotels and restaurants. The combination of waste reduction and local food production represents a holistic strategy for sustainable island living.

Despite the project's success, challenges remain—particularly in scaling operations, securing chicken livestock, and ensuring consistent maintenance of BSF systems. Nonetheless, community members like Muhammad Ilyas and Rico report ongoing benefits, from waste reduction to food security and economic opportunities. BSF farming, once unknown, is now considered a key innovation in preserving Maratua's ecological balance.

Maratua, dubbed "Paradise in Northern Indonesia," continues to thrive as a marine tourism hotspot. Yet, its preservation depends on sustainable practices. Through ITB's interventions and local commitment, this tropical gem is on a path to remain not only a prime tourist destination but also a model for eco-conscious, self-sustaining island communities.

Extending Farmers' Harvests Through Drying Technology

Prof. Lienda Aliwarga

Faculty of Industrial Technology

Many farmers in Indonesia face significant post-harvest losses, especially with crops like stevia and seasonal fruits. For stevia, improper sun-drying can result in up to 40% product failure, while fruits often spoil due to market oversupply. To address these challenges, researchers from the Bandung Institute of Technology (ITB) introduced drying cabinet technology to help farmers preserve their harvests, improve quality, and boost income—especially in Lembang (West Java) and Flores (East Nusa Tenggara).

Stevia (Stevia rebaudiana) is a high-value crop known for its zero-calorie natural sweetening properties. Its dried leaves contain steviol glycosides, which are 300–500 times sweeter than sugar. With growing domestic and international demand—especially from the food, beverage, and pharmaceutical sectors—stevia has become a profitable alternative for farmers like Thio Setiowekti, who shifted from coffee farming to stevia cultivation in Lembang.

Thio partnered with academics and companies to supply high-quality dried stevia leaves. However, traditional sun-drying methods proved unreliable due to unpredictable weather, leading to uneven drying, contamination, and significant loss. The process, requiring consistent sunlight for up to two days, often failed during the rainy season, lowering the leaves' market value due to browning and excess moisture.

To solve this, in 2021, ITB's Faculty of Industrial Technology provided a drying cabinet to Thio and his community through its community service program. Led by Prof. Dr. Lienda Aliwarga Handojo and her team, the drying cabinet enabled farmers to process stevia leaves in a controlled environment. With this machine, drying time was reduced to as little as 4–8 hours, preserving leaf color, hygiene, and sweetness—meeting market standards with under 10% moisture content.

Encouraged by this success, ITB expanded the technology to support fruit and vegetable farmers. In 2022, another drying cabinet was donated to a farmers' group in Suntenjaya, Lembang, where seasonal crops like lemons, beets, and eggplants often went unsold. During the pandemic, lemon prices plummeted, leaving farmers devastated. Drying the lemons helped create high-value products such as dried lemon slices, selling for up to IDR 200,000 per kilogram, even reaching markets in Jakarta.

The drying cabinet also proved useful in maintaining nutritional quality. With controlled temperatures below 50°C, nutrients and vitamins in dried fruits remained intact. This allowed farmers to preserve misshapen or undersized produce that would otherwise be discarded, turning waste into profit and extending the shelf life of harvests.

ITB's drying technology has transformed post-harvest handling for many rural communities. Farmers like Thio now process up to six drying cycles per day, increasing income and reducing waste. Though currently powered by LPG gas, future models are planned to use biogas for improved sustainability. The initiative also builds local capacity, as farmers are trained to operate and maintain the machines independently.

In conclusion, the introduction of affordable and efficient drying technology by ITB has empowered smallholder farmers to better manage post-harvest losses, improve product quality, and access wider markets. It highlights how simple innovations can bring substantial change to rural livelihoods, paving the way for a more resilient and sustainable agricultural economy.

From Waste to Wealth: Turning Cow Manure into Biogas in Kuningan

Dr. Ir. Suyatman

Faculty of Industrial Technology

Cipari Village in Cigugur Subdistrict, Kuningan, is known for its fresh dairy production, thanks to its highland location near Mount Ciremai. However, the growing dairy industry has led to environmental problems, with cow manure being discharged directly into rivers. This waste pollutes waterways, causing foul odors and community protests. In response, the Bandung Institute of Technology (ITB), led by Dr. Suyatman, initiated a project to convert manure into biogas, reducing pollution while creating renewable energy and economic opportunities.

The project focuses on building a biogas processing facility in partnership with local cooperatives, particularly KSU Karya Nugraha Jaya. Most dairy farms in the region lack proper waste management systems, especially smaller farms. By engaging a cooperative with over 1,000 members and significant land holdings, ITB implemented a centralized solution. The installation includes two 50 m^3 biodigesters and aims for zero waste, converting all manure into energy and fertilizer. The biogas system powers various needs, such as heating water for cleaning milk cans and supplying electricity for equipment. Excess slurry becomes high-quality organic fertilizer. This initiative not only addresses environmental concerns but also supports farmers' productivity and income. The cooperative collects over 35,000 liters of milk daily, which requires strict hygiene—a need now fulfilled using biogas-heated water systems.

A distinctive aspect of this project is the innovative biodigester design, featuring conical bases and integrated outlet tanks to improve gas production and reduce land use. Methane gas is stored in fixed and floating tanks to prevent atmospheric release. Floating tanks regulate gas flow and pressure, mimicking industrial gas storage systems. These design improvements are based on previous ITB trials and aim to maximize efficiency and safety.

The biogas supports diverse energy uses: lighting (to ensure cows remain active at night), cooking, and powering equipment like pumps and generators. For broader sustainability, ITB is exploring replacing LPG fuel with biogas and integrating solar power systems. The installation also serves as an educational site for students, farmers, and the public, promoting knowledge-sharing and sustainable practices.

The initiative involves multi-disciplinary teams from ITB, including experts in energy, fluid mechanics, biomass processing, and materials. It evolved from a single research group into a broader collaboration, demonstrating how renewable energy like biogas intersects with multiple technical fields. Monitoring systems using Internet of Things (IoT) technology are also being considered to oversee the plant remotely.

Beyond technology, the project strengthens community ties. Farmers who once polluted rivers now produce clean energy and fertilizer. ITB's involvement has been welcomed, with locals eager for continued support and expansion. There's potential to replicate this model in other regions, creating a network of sustainable, community-based energy systems rooted in local cooperatives.

Ultimately, this program exemplifies ITB's commitment to public service and sustainable development. By transforming livestock waste into valuable resources, the project addresses environmental pollution, energy shortages, and rural livelihoods. It offers a replicable model for balancing agriculture and ecology, helping West Java's dairy farmers move from being sources of pollution to leaders in innovation and renewable energy.

Selected Innovator

01 *Prof. Trio Adiono*

02 *Prof. Ketut Adnyana*

03 *Prof. Heni Rachmawati*

04 *Permana, M.T.*

05 *Djarot Widagdo, Ph.D.*

06 *Dr. M. Agoes Moelyadi*

07 *Prof. Endra Joelianto*

Infusion and Syringe Pump: Smart Medical Devices for Precision and Safety

Prof. Trio Adiono

School of Electrical Engineering and Informatics

The Infusion Pump and Syringe Pump are two advanced medical devices developed to deliver fluids, electrolytes, and medications into the patient's body with high accuracy and control. Designed by researchers from the School of Electrical Engineering and Informatics at Institut Teknologi Bandung (ITB), these devices are crucial in both intensive care and routine medical settings.

The Infusion Pump features a robust system that includes a printed circuit board (PCB), embedded software, a touchscreen-based GUI, and real-time internet connectivity via Wi-Fi and Ethernet. It supports real-time monitoring of vital parameters such as volume to be infused (VTBI), remaining infusion time, infusion rate, and line pressure. A three-level alarm system ensures patient safety, signaling issues like high pressure, improper installation, or nearing end of infusion. It also records patient data and synchronizes it with cloud storage for better clinical integration. Its power system includes a 7.4V – 5200mAh battery, ensuring uninterrupted use during power failures.

Similarly, the Syringe Pump is engineered for precision drug delivery using programmable settings and electronic control. It offers intuitive interaction via a touchscreen and allows real-time monitoring through a web interface. The alarm system is designed with tiered alerts, including critical warnings when infusion ends or when the syringe is incorrectly loaded. Connectivity through Wi-Fi and Bluetooth enhances its usability in modern healthcare environments. The pump also has a backup battery (11.1V – 2600mAh) to maintain operation during outages.

Infusion Pump

Syringe Pump

Both devices prioritize safety, reliability, and user-friendliness. They are equipped with high-local-content designs suitable for the Indonesian medical market, making them competitive with imported alternatives. The design includes intuitive interfaces, customizable alarm triggers, and robust data logging features, all while maintaining compact and ergonomic hardware structures.

These innovations are spearheaded by Professor Dr. Trio Adiono, an expert in VLSI design and embedded systems. A full professor at ITB and a globally recognized scientist, Prof. Adiono has contributed to the development of numerous microchips and IoT systems.

His extensive experience spans international collaborations, academic leadership, and award-winning technological innovations, making him a key figure in Indonesia's medical device development.

In summary, the Infusion and Syringe Pumps represent a leap in Indonesia's healthcare technology, combining precise engineering, user-focused design, and seamless data integration to improve patient care while supporting local medical industries.

Eggshell Membrane: from Waste to Healthy and Beauty

Prof. apt. I Ketut Adnyana

School of Pharmacy

To meet the needs of the Indonesian population, the majority of raw materials and products for medicines, health supplements, and cosmetics still rely on imports. Interestingly, the initial raw materials for these products are abundantly available in Indonesia. One of them is the need for raw materials containing hyaluronic acid, collagen, and amino acids for medicines, health supplements, and cosmetics. These valuable components can be derived from eggshells, which in Indonesia are waste products from the food industry, including cakes, biscuits, and other goods. In fact, these discarded products become waste that contributes to environmental pollution.

The aim of this research is to transform eggshell waste into valuable products, including eggshell membranes and eggshell membrane hydrolysates, which can serve as raw materials for further development into medicinal products, health supplements, and cosmetics. This research was done in three stages:

First stage: the eggshell membrane is separated from the shell, then dried and powdered to a specific size. Eggshell membrane powder is checked for microbial content to meet pharmaceutical raw material standards according to Indonesian government regulations.

Second stage: the eggshell membrane powder is hydrolyzed to obtain eggshell membrane hydrolysate and further checked for its chemical contents.

Third stage: the two raw materials that meet the requirements are further developed into medicinal and cosmetic products and tested for their activities. Two raw materials were successfully developed, namely eggshell membrane and eggshell membrane hydrolysate, which met the requirements and obtained a registration number from the Drug and Food Regulatory Agency of the Republic of Indonesia, as well as the development of the dosage form, namely a topical medicinal product (gel formulation) for treatment of psoriasis and cosmetic products in the form of antiaging serum.

eggshellent

eggShellent

ANTIAGING SERUM

USP :

- From waste to valuable Active ingredients,
- the Eggshell membrane is hydrolyzed with natural plant-based enzymes papain originated from Indonesia."

Selected Innovator 03

Developing Catfish Oil Gummies for Industrial and Nutritional Use

Prof. Dr. apt. Heni Rachmawati

School of Pharmacy

The still high stunting problem in Indonesia, which is 30.8% (Riskesdas, 2018), poses a threat and challenge to the quality of future human resources. One of the efforts to combat stunting is the provision of high-protein food. Fish are a good source of protein because of their complete amino acid content and other bioactive compounds that are beneficial for bone and brain growth. In this invention, we focus on addressing stunting through the supplementation of catfish oil, which can support increased appetite, brain development in toddlers and adolescents, and improved immunity. This innovative product is a more appropriate method of fish oil supplementation for toddlers compared to the available emulsion liquid form, and for teenagers and adults, it comes in the form of soft capsules, called Ole-smart Aquatic gummy. The product has been successfully developed on an industrial scale, with BPOM certified. To increase sales volume and reach a wider consumer base, a collaboration with the pharmaceutical industry has been explored.

Aquatiq Gummy catfish oil (Ole Smart) is a healthy food product aimed especially for children and teenagers who need an intake of omega compounds and healthy fatty acids as well as fat-soluble vitamins (A, D, E). These compounds are found in catfish oil which is the main active ingredient in the Aquatiq Gummy Ole Smart product. The advantage of catfish oil is: produced from freshwater fish which is generally hypoallergenic compared to fish oil from sea fish. Aquatiq Gummy Ole Smart has been tested in a certified laboratory and has been tested pre-clinic, the effectiveness to improve memory. The results are significantly different compared to placebo. Based on theoretical and laboratory data, Aquatiq gummy Ole Smart is suitable for children and teenagers who are in the growing phase. Daily consumption of Aquatiq Gummy Ole Smart can help increase intelligence.

Apart from that, the content of various active compounds in catfish oil can increase appetite and immunity. The main basic ingredient of Ole Smart gummy, namely beef gelatin, is animal protein which also plays a role in macronutrient intake.

Apart from being of certified quality, Aquatiq Gummy Ole Smart is also halal certified, so there is no doubt to be consumed by all levels of society.

Selected Innovator 04

Research on Modular Wood Block Systems

Permana, S.T., M.T.

School of Architecture, Planning and Policy Development

Permana, S.T., M.T., a faculty member at SAPPK, Building Technology Expertise Group, has been developing a Modular Wood Block System since 2016. This research led to the creation of an innovative engineered material for knock-down housing components. The invention includes modular wood block profiles and interlocking modular wood panels, which were patented through LPIK ITB in 2017 under patent numbers P00201609045 (Wood Block) and P00201700592 (Modular Wood Panel). Following the registered patents, the product underwent refinement through reverse engineering. Collaborative efforts were then initiated with various industry partners, including PT. Sistem Dirgantara Inovasi Teknologi and TESDC Polman Bandung for prototype development workshops and modular component production. Additional collaborations were established with PT. Deliman for IT development and PT. Bintang Tjipta Pertama for prototype manufacturing.

Three key highlights from 2023 to 2024 include:

Innovation in Knock-Down Construction within the Twins-Digital Ecosystem Based on Big Data for Modular Wood Block Architecture Applications.

In collaboration with IT consultant PT Deliman Integra and young researcher Galuh Kresnadian Tedjawinata, S.Ars., M.Ars., the target for 2023 is the development based on the Twins-Digital Ecosystem, which includes both physical (building) and visual (software) representations. This large-scale development is expected to streamline the process from upstream (wood raw material procurement) to downstream (IT-based modular housing products). The total development load for the application is 70%, as the web-based mainframe is intended for the next phase of development. The research and findings are available on the website:
[http://www.blockwood.org].

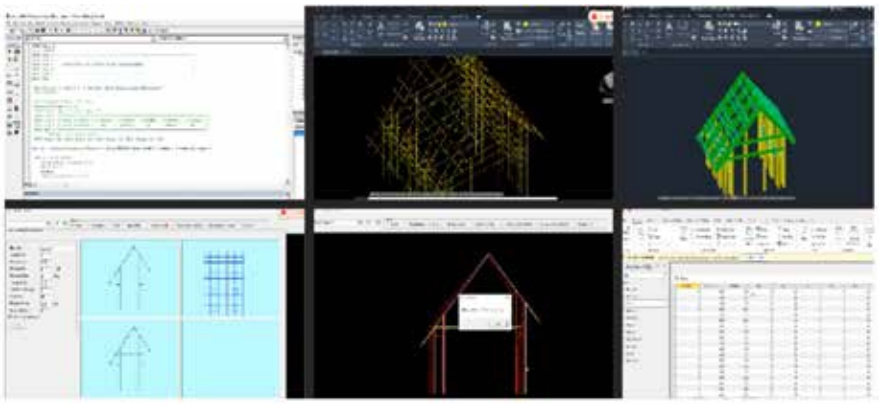


Figure 1. (1) Coding Process, (2) Input Parameters, (3) Element Codification, (4) Structural Calculations, (5) Volumetric Structure, (6) Results Database

Development of Numerical and Experimental Methods for Structural Systems. Case Study: Engineering of Modular Wood Block Buildings.

In collaboration with PT. Syapril Janizar, former faculty member of the Building Technology EG Hidayat Amir S.T., and young researcher Galuh Kresnadian Tedjawinata, S.Ars., M.Ars., this research develops numerical and experimental methods for structural systems in modular wood block architecture, with potential for commercialization and downstream applications. The C# programming language is used for the development of simulation software and modular structural calculations, while VB supports the creation of a user-friendly interface to facilitate data input and produce accurate calculations.

This research successfully developed a numerical method based on programming using Visual Basic to design and calculate the structural strength of wood-based modular buildings.

The conclusion drawn from the study is that the Modular Wood Block System achieves optimal performance in an integrated configuration. Partial designs tend to reduce structural efficiency, highlighting the importance of a comprehensive design approach for the practical application of the Modular Wood Block System.

Low-Cost Kamikaze Underwater Drone: Strategic Solutions for Securing Indonesia's Borders

Dr. Ir. Djarot Widagdo

Faculty of Mechanical and Aerospace Engineering

Low-Cost Kamikaze Underwater Drone: A Strategic Solution for Indonesia's Border Security. The development of Kamikaze Underwater Drone is a strategic step in answering the challenges of Indonesia's maritime defense needs. To be developed as lightweight torpedo class based on the drone technology, this vehicle platform offers an efficient and innovative solution to overcome the limitations of conventional torpedoes used by the Indonesian Navy. In addition to providing operational advantages, the collaborative process supported by the government matching fund program for the development of this underwater drone is able to strengthen the ecosystem of domestic defense technology research and development through collaboration between industry, universities, and society.

The advantages of Kamikaze Underwater Drone

The Kamikaze Underwater Drone is designed with various advantages over conventional torpedoes, such as:

1. **Low Production Cost**

Their small size allows for lower production costs, so these drones can be produced in large quantities. It is ideal for attacking small infrastructure such as small harbors, small ships, or unmanned systems such as USVs and UUVs.

2. Number of Installations and Swarming Operations

The small design allows more units to be installed on a single platform. To illustrate, one SUT torpedo can be replaced by up to 14 Kamikaze Underwater Drone units, and installations on anti-submarine helicopters can be twice as many as the A244/S light torpedo.

3. Detection Difficulty

With a cross-sectional area of only about 10% that of a heavy torpedo like the SUT, these drones are difficult for active sonar to detect. In addition, the low power requirements result in minimal noise, making detection by passive sonar difficult.

4. Operational Platform Flexibility
Its size and light weight allow it to be mounted on small patrol boats, helicopter drones or unmanned surface vessels (USVs), expanding its use options in shallow or border waters.

5. Development Strategic Impact
Through an industry and university collaboration program, the development of this drone is expected to strengthen Indonesia's defense technology independence. One form of this collaboration is through the Kedaireka matching fund mechanism that allows the integration of university research results with industry needs and capabilities.

Selected Innovator 06

ITB High Altitude Long Endurance (HALE) UAV

Dr.–Ing. M. Agoes Moelyadi

Faculty of Mechanical and Aerospace Engineering

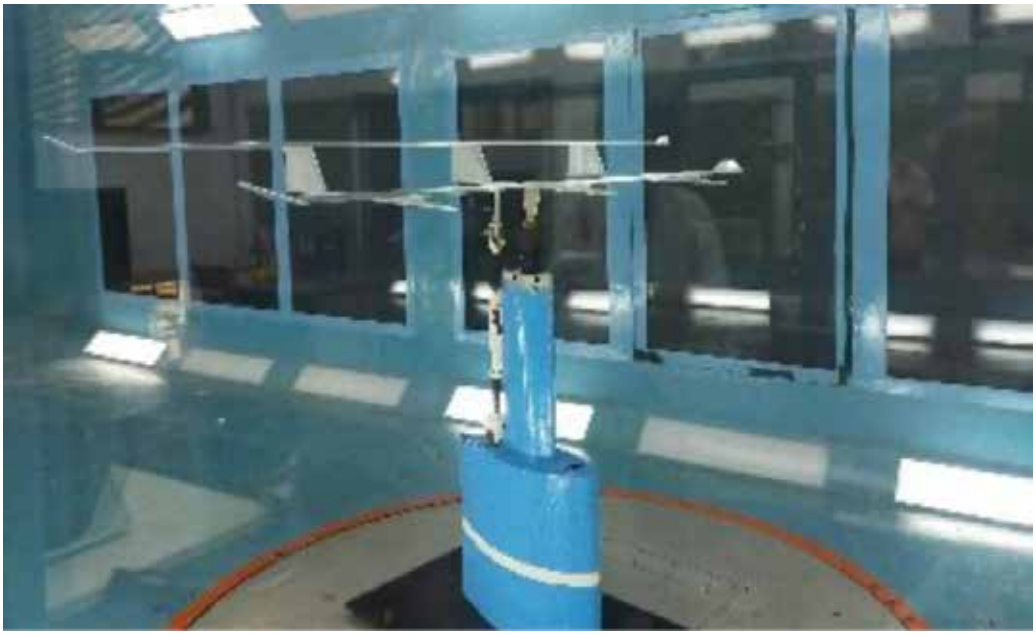
The High-Altitude Long-Endurance (HALE) Unmanned Aerial Vehicle is an advanced aerospace platform engineered to operate in stratospheric condition (40 - 60 kfeet). Designed for missions requiring prolonged endurance and exceptional altitude performance, this UAV offers strategic capabilities for both civilian and military applications. To ensure the availability of UAVs equipped with reliable airborne surveillance and communication systems to address threats across the Indonesian archipelago's borders, ITB (Bandung Institute of Technology), in collaboration with industry partners in unmanned systems, have been developing HALE UAV that is supported through the Innovative-Productive Research (RISPRO) program of the Educational Fund Management Agency (LPDP).

The platform is designed with a focus on operational efficiency and reliability, incorporating redundant systems and advanced power management to ensure mission success in the most demanding scenarios.

Its capability to operate autonomously over extended periods, making it a cost-effective and strategic asset for long endurance operations. The airframe of the HALE UAV is constructed using composite materials to minimize structure weight and withstand the demanding conditions of stratospheric flight. Its aerodynamic shape design minimizes drag while maximizing lift efficiency, enabling operations at higher altitudes. This ensures continuous coverage over vast territories while avoiding atmospheric disturbances and ground-based threats.

Powered by a hybrid solar-electric propulsion system, the HALE UAV achieves flight endurance, capable of sustaining missions for extended periods. This renewable energy approach not only reduces operational costs but also aligns with global environmental sustainability goals, providing a reliable and eco-friendly solution for long-duration operations.

The UAV's advanced payload integration capabilities support a wide range of mission-specific equipment, including high-resolution optical sensors, infrared cameras, and synthetic aperture radar. These systems enable real-time data collection and transmission, making the HALE UAV an indispensable platform for applications such as border surveillance, environmental monitoring, and disaster assessment.
The HALE UAV exemplifies a commitment to innovation in high-altitude aviation, offering unmatched endurance, adaptability, and sustainability. This cutting-edge platform is a milestone in unmanned aerial technology, delivering solutions for the challenges of modern surveillance and connectivity.



Selected Innovator 07

OvioTrap IoT: Smart Solution for Dengue Control

Prof. Ir. Endra Joelianto, Ph.D.

Faculty of Industrial Technology

Dengue fever is one of the most significant public health challenges, exerting a substantial impact on both the healthcare sector and the economy. Over the years, this burden has continued to grow alongside population increases and urban expansion. Effective disease control faces numerous challenges, including difficulties in detecting Aedes aegypti mosquito populations (the primary vector of dengue), high costs of vector control, and limited public awareness and participation in maintaining clean environments.

To address these challenges, OvioTrap IoT emerges as an innovative technology leveraging the Internet of Things (IoT) to control dengue outbreaks more efficiently and effectively. This smart device is designed to detect and count Aedes aegypti mosquito eggs in real time across multiple locations. The collected data is automatically transmitted to a web-based dashboard, which provides accurate, user-friendly information.

With this feature, OvioTrap IoT enables centralized mosquito population monitoring and early detection of high-risk areas, allowing for prompt and targeted preventive actions.

The core strength of OvioTrap IoT lies in its ability to provide efficient, data-driven solutions. Through real-time monitoring, the device facilitates stakeholders—including health agencies and communities—in identifying areas at high risk of outbreaks. Consequently, control measures such as fogging or environmental cleanup can be implemented more strategically, reducing time and cost inefficiencies. Furthermore, OvioTrap IoT fosters community engagement by promoting cleaner, mosquito-free environments. Support for Pest Control Companies: Enhances the efficiency and effectiveness of pest control companies by providing precise data on high-risk areas, enabling them to offer more targeted and strategic interventions.

This technology is also designed with high scalability, making it suitable for deployment in a wide range of settings, from households and residential areas to larger urban regions. With its holistic approach, OvioTrap IoT not only helps reduce dengue cases but also supports preventive health programs at a broader scale.

With its comprehensive benefits, OvioTrap IoT offers new hope in the fight against dengue fever. By combining advanced technology with practical applications, it empowers communities and health agencies to collaboratively create a safer, healthier, and dengue-free future.

Selected Startup

01 *EBM*

02 *Modultrax*

03 *Ganesh Osmotech*

04 *Antrique*

05 *Akseleraksi*

EBM Scitech: Research-Based Startup Advancing Natural Product Innovation

EBM Scitech (PT EBM Saintifik dan Teknologi) is a research-based startup established in 2020 in Bandung, West Java. It originated from a research commercialization initiative under the Productive Innovative Research (RISPRO) grant funded by Indonesia's LPDP and has strong roots in the academic and research community of the School of Pharmacy at Institut Teknologi Bandung (ITB). The startup focuses on providing research and development (R&D) services, laboratory analysis, and consulting for industries in food, pharmaceuticals, and cosmetics—especially those utilizing natural and herbal ingredients.

Services and Facilities

EBM Scitech offers a range of services, including:

- Research and Development (R&D): Assisting companies in developing new products or improving existing ones.
- Laboratory Analysis: Providing quality testing and analysis using advanced equipment.
- Consulting: Supporting product development with expert guidance.

The company is equipped with state-of-the-art laboratories, including facilities for natural products, analytical chemistry, bioassays, and formulation—ensuring high-quality research and results.

Products and Innovations

EBM Scitech has developed several spin-off products, such as:
- MarkHerb: Supplies marker compounds derived from Indonesian medicinal plants for research and industry.
- Flabio: A line of scientifically developed food and supplement products.
- NüU Reboot and Ersch: Cosmetic and supplement products developed through scientific research.

They have also developed OMICverse, one of the most comprehensive biodiversity databases in Indonesia.

Collaboration and Recognition

In 2024, EBM Scitech signed a memorandum of understanding with PT Mutuagung Lestari Tbk. (MUTU International) to collaborate on research, testing, and certification services for herbal products. This collaboration aims to strengthen herbal analysis services and enhance the competitiveness of Indonesia's phytopharmaceutical and herbal industries.

EBM Scitech is also active in the startup ecosystem, participating in events such as the TECH PLAN Demo Day Indonesia 2023, reflecting its commitment to innovation and scientific development.

Team and Leadership

EBM Scitech is led by Dr.rer.nat. Agus Chahyadi as CEO, supported by a team of experts in chemistry, pharmacy, and biotechnology. The team has international experience and is committed to advancing science-based innovation in Indonesia.

For more information, visit www.ebmscitech.com or follow them on Instagram: @ebmscitech.

Modultrax: Revolutionizing Remote Logistics with Modular Electric Vehicles

Modultrax is an Indonesian research-based startup that has developed a modular electric utility vehicle designed for all-terrain use. The vehicle was initially conceived to address logistical challenges during the COVID-19 pandemic, specifically the distribution of vaccines to remote areas in Indonesia. Beyond this, Modultrax aims to provide solutions for broader logistical issues in the country's remote regions.

Origins and Development

Modultrax was initiated in early 2021 by Bismo Jelantik, M.Ds., a lecturer at the Faculty of Art and Design at the Bandung Institute of Technology (ITB). The project began with conceptualization and design using 3D Computer-Aided Design (CAD) technology. Bismo collaborated with PT Ganding Toolsindo, utilizing their CNC Bending Pipe and 3D scanning capabilities to enhance design accuracy. Although the initial goal was to create a design, the project progressed to the development of a working prototype.

Design and Features

Modultrax is an electric vehicle powered by a battery, featuring a modular cargo system that can be adapted for various applications, including agriculture, defense, medical transport, and disaster mitigation. Its modular design allows for the attachment of different tools and equipment, making it versatile for multiple uses. The first prototype has a range of approximately 50 kilometers. The vehicle is designed with a high degree of local content, with over 75% of its components sourced locally, aligning with the national movement to support Indonesian-made products.

Recognition and Future Plans

Modultrax has been showcased in various exhibitions, including the Government Goods and Services Procurement Exhibition organized by the Ministry of Cooperatives and SMEs of the Republic of Indonesia. The design has been registered for intellectual property rights, and the first-phase prototype is currently undergoing trials. The team plans to continue developing the vehicle, with aspirations for mass production and broader application across Indonesia's diverse terrains.

For more information, you can visit their official website: modultrax.com or follow them on Instagram: @modultrax.

Ganesh Osmotech: Clean Water Innovation for a Healthier Future

Ganesh Osmotech is a research-based startup originating from the Bandung Institute of Technology (ITB) in Indonesia. The company is dedicated to developing innovative water filtration technologies aimed at providing sustainable and affordable clean water solutions for communities, particularly in underserved and remote areas.

Vision and Mission

Ganesh Osmotech's mission is to address water scarcity and quality issues by leveraging advanced filtration methods. The startup aims to ensure that clean and safe drinking water is accessible to all, thereby improving public health and promoting environmental sustainability.

Technological Innovation

The startup focuses on creating water filtration systems that are not only effective but also cost-efficient and easy to maintain. These systems are designed to be adaptable to various environmental conditions, making them suitable for deployment in diverse settings, including rural and disaster-affected areas.

Community Engagement

Ganesh Osmotech actively collaborates with local communities to implement its filtration systems. For instance, in certain neighborhoods, the installation of Ganesh Osmotech's water filters has led to a noticeable reduction in plastic waste from bottled water, as residents shift to using filtered tap water. This not only promotes environmental sustainability but also reduces household expenses on bottled water.

Recognition and Participation

Ganesh Osmotech has been featured in events such as the ITB CEO Summit 2024, highlighting its role in technological innovation and social entrepreneurship. The startup's approach combines scientific research with practical applications, aiming to make a tangible impact on public health and environmental conservation.

For more information or to explore collaboration opportunities, you can visit their official website or follow their updates on social media platforms.

From AntriQue to WaitHub: Reinventing the Waiting Experience

AntriQue, a startup nurtured by the Bandung Institute of Technology (ITB), has rebranded to WaitHub as part of a strategic transformation to address global challenges in queue management. This rebranding was officially launched on August 14, 2024, at the Science Techno Park (STP) Ganesha, Bandung.

From AntriQue to WaitHub: A Strategic Transformation

After four years of providing queue management solutions, AntriQue evolved into WaitHub to better align with its mission of enhancing the waiting experience. This transformation introduces new features such as booking, virtual waiting, online payments, and service provider ratings, aiming to offer convenience and efficiency to users.

Expanding Services Across Multiple Sectors

WaitHub extends its services to six key sectors: Tourism, Healthcare, Banking, Government, Food & Beverage, and Telecommunications. Each sector has unique needs, and WaitHub has developed customizable solutions to meet these specific requirements.

Empowering the Waiting Experience

With the tagline "Empowering Waiting," WaitHub aims to transform the concept of waiting from a challenge into a valuable asset. By integrating features like virtual waiting and online booking, WaitHub enhances operational efficiency and customer satisfaction. The platform also contributes to local economic growth by enabling customers to utilize their waiting time in nearby establishments.

Support from ITB's Innovation Ecosystem

WaitHub's development is supported by ITB's PRIME STeP program, which focuses on fostering innovation, research, and startup incubation. This support includes access to advanced laboratory facilities and comprehensive mentoring, positioning WaitHub for both domestic and international expansion.

For more information, visit waithub.id or follow their updates on social media platforms.

Akseleraksi: Empowering Indonesian MSMEs Through Strategic Business Coaching

Akseleraksi is a research-based startup established in 2022 by students and alumni of the School of Business and Management at Institut Teknologi Bandung (SBM ITB). The startup focuses on empowering Micro, Small, and Medium Enterprises (MSMEs) by providing tailored business consulting, training, and mentorship programs designed to enhance their capacity and competitiveness.

Mission and Services

Akseleraksi aims to help MSMEs overcome business challenges through several key programs:

- Business Clinic: One-on-one sessions with experienced business coaches to identify and solve specific issues faced by MSMEs.
- Training and Workshops: Capacity-building programs that focus on strengthening managerial and operational skills.
- Sustained Mentorship: Long-term guidance to support the implementation of effective and sustainable business solutions.

Impact and Reach

Since its launch, Akseleraksi has delivered over 2,000 hours of training to more than 338 MSMEs across 26 cities and regencies in Indonesia. The team has collaborated with 150 brands and suppliers and is supported by 12 expert coaches in their programs.

Strategic Collaborations

Akseleraksi actively collaborates with various institutions, including the Ministry of Cooperatives and SMEs, Rumah BUMN Bandung, and The Greater Hub SBM ITB. One notable initiative is the West Java MSME Coaching Clinic, where hundreds of MSMEs received structured training and mentorship.

Technology and Innovation

To improve efficiency, Akseleraksi is developing a digital platform equipped with features like automated consultation chatbots and an online scheduling system. These innovations aim to broaden their service reach and make it more accessible for MSMEs.

Founders and Leadership

Akseleraksi was founded by Raja Aksana Alrando and Gilang Bagaskara, both alumni of the ITB MBA program. Raja brings over a decade of experience in industry, including roles at Telkomsel, Sampoerna, and tech startups like Youtap Indonesia and Chatbiz.id.

Selected Research Center National Center of Excellence

01 *Center of Artificial Intelligence*

02 *Center of Excellence in Broadband Wireless Access*

03 *Smart City and Community Innovation Center*

04 *National Center for Sustainable Transportation Technology*

05 *Center of Excellence in Earthquake Science & Technology*

06 *Center of Excellence in Carbon Capture Storage & Carbon Capture, Utilty, & Storage*

07 *Research Center for Nanoscience and Nanotechnology*

08 *Center of Excellence in Nutraceutical*

09 *Center of Excellence in Defense and Security Technology*

01

Center of Artificial Intelligence

Labtek V lantai 2 Jalan Ganesha No. 10 Bandung 40132 | aicenter@itb.ac.id | phone: +62-(22)-2508135

ITB AI Center was established in 2019 based on ITB Rector SK no. 271/SK/I1.A/2019. The center's vission is to become a leading center for the development of Artificial Intelligence at the national and international levels; and able to produce research and innovation products that are beneficial for the welfare of society. Its missions include: (1) Produce various research and innovation products in the field of Artificial Intelligence that are beneficial to the welfare of society, (2) Improving the quality of Artificial Intelligence research at ITB, including those that are multi-disciplinary as a result of collaboration between research groups, (3) Increasing Artificial Intelligence research collaboration between ITB and industry, government and other research institutions both domestically and (4) Encouraging the advancement ofArtificial Intelligence education, and (5) Encouraging understanding of the application of Artificial Intelligence in society.

In 2020, ITB AI Center has received funding from Ministry of Education and Research as University Center of Excellence on Artificial Intelligence of Vision, NLP and Big Data Analytics. Team Members of ITB AI Center comefrom various school/faculty in ITB such as School of Electrical Engineering and Informatics, Faculty of Industrial Technology, Faculty of Math & Science, School of Pharmacy, School of Life Science and Technology, School of Business & Management, School of Architecture, Planning and Policy Development, Faculty of Mining and Petroleum Engineering.

Basically, research and product developed by members of ITB AI Center are related with the usage of Artificial Intelligence technology invarious domain. For example, adding Artificial Intelligence technology into glider or vehicle to make it autonomous, or adding AI technology to social network data to get hidden insights of the data, or using video analytics to measure a person's heart rate.

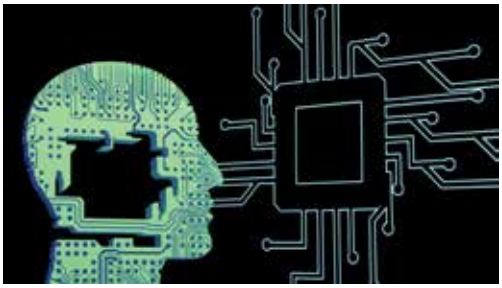


Figure 1 AI Ilustration

Figure 2 AI Technology in Underwater Gliders

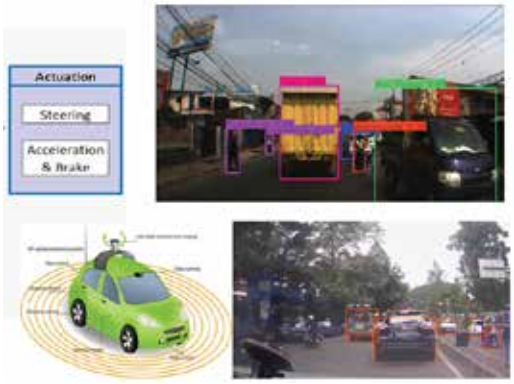


Figure 3 AI technology for Autonomous Electric Vehicles

Figure 4 Social Media Monitoring for Hoax Information and Public Opinions (Sentiments).

With 28 active lecturers in 2022, the ITB AI Center received the PUI-PT grant from the Ministry of Research, Technology, and Higher Education. In addition to the PUI-PT grant, the ITB AI Center also received three national research grants and one international research grant, as well as 10 community service activities in the form of research.

The ITB AI Center also organized various AI-related training sessions at the national level. Besides national and international publications, the ITB AI Center has one licensed system, OvTrap (AI for mosquito detection in dengue fever monitoring). In terms of activity, the ITB AI Center in 2022 co-hosted the ICAICTA conference held in Japan, with Toyohashi University of Technology as the main host.

Additionally, the ITB AI Center organized 12 webinars whose recordings can be accessed on the AI Center's YouTube channel. Regarding student activities, the ITB AI Center also accepted internship students in 2022 from the ITB Informatics Undergraduate Program and the ITB Urban and Regional Planning Master's Program.

Dr. Eng. Ayu Purwarianti, M.T.
Head of AI Center
ayu@informatika.org

02

Center of Excellence in Broadband Wireless Access

PAU Building 4th Floor, Institut Teknologi Bandung | www.pme.itb.ac.id | phone: +62-(22)-2506280

National Center on Broadband Wireless Access (NC-BWA) is a Research Center at ITB focusing on the development of Technology, Electronic Products and Industries in Indonesia. The field of research and development covers the entire ecosystem of the electronics industry from upstream to downstream, namely Chip Technology (component), Electronic Systems Technology (ODM/OEM), Technology and Electronic Equipment Manufacturing Technology. NC-BWA ITB is supported by four laboratories and equipped with international standard research equipment, such as IC Design (Integrated Circuits), IC Processing, Electronic System Design, and Electronic Manufacturing.

In addition to conducting research activities, NC-BWA TTB is also active in conducting product development activities with local industries and abroad; conducting research results dissemination through activities such as international conferences, journal publications, workshops, and training. PME ITB also has intensive cooperation with universities from home and abroad.

In 2013, through the Ministry of Research and Technology, Microelectronics Center ITB defined as one that fostered Leading Center of Science and Technology trom 2014 to 2016 as an Advanced Center of Science and Technology (Pusat Unggulan IPTEK Perguruan Tinggi) on Broadband Wireless Access (PUIBWA).

Figure 1 Respinos (NC-BWA Product)

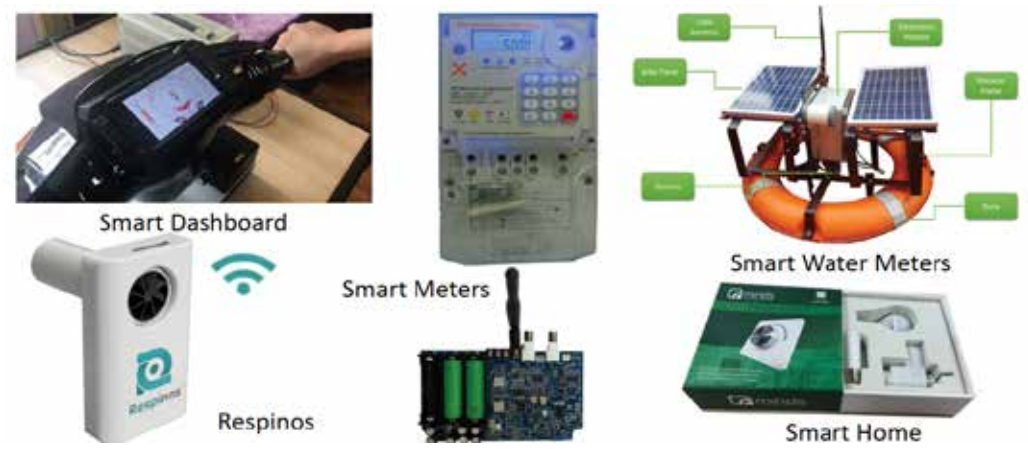


Figure 2 NC-BWA Products

The BWA Science and Technology Center has four main objectives:

Increasing Connectivity of Indonesia's Economic Corridors

PUI-BWA is expected to provide connectivity infrastructure that is affordable, available, accessible, reliable, and high-performance. Connectivity supports communication between and within economic corridors, impacting the acceleration of national economic growth (MP3EI).

Development of the BWA Industry Ecosystem

The BWA industry ecosystem aims to produce competitive, creative, and innovative devices and services. Within the ecosystem, PUI-BWA acts as a Technology Provider and Catalyst for the components of the industrial value chain for devices and services. PUI-BWA also synergizes all components of this value chain, resulting in successfully mass-produced products.

Development of Technology and Engineering Design

Together with the BWA ecosystem, PUI-BWA masters, accumulates, and disseminates technology. This results in high value-added products with high local content (TKDN).

Human Resource (HR) Development

PUI-BWA plays a role in providing quality human resources for the entire ecosystem, resulting in a critical mass. With strong human resources, it is expected to generate various technological breakthroughs.

Enhancing Economic Growth

In collaboration with various parties, such as the Ministry of Industry, Ministry of Research and Technology, Ministry of Education, and Coordinating Ministry for Economic Affairs, PUI-BWA aims to create regulations and investment conditions conducive to accelerating economic growth.

Prof. Trio Adiono, Ph.D.
Head of NC-BWA Product
tadiono@stei.itb.ac.id

03

Smart City & Community Innovation Center

Gedung Labtek VIII Lt.3 Jl. Ganesha No. 10 Bandung 40132 | https://citylab.itb.ac.id/sccic2/

Institut Teknologi Bandung (ITB) is committed to supporting the development and construction of smart cities. The living lab model developed by ITB was proposed as one of the policy briefs in the G20 meeting.

ITB has a research center called SCCIC, or the Smart City and Community Innovation Center.

SCCIC is a multidisciplinary research and development center with experts from various fields to support the development of smart systems, including smart cities. This research center has produced and implemented many initiatives. SCCIC also conducts the Indonesian Smart City Rating annually to measure the progress of city development in Indonesia towards becoming smart cities.

SCCIC - Is a smart city innovation community that has a vision to develop innovations to create a smart city (smart and fast). In addition, SCCIC helps provide direction and knowledge for the government, industry, society, and other communities on city problems that occur today due to urbanization and how to solve these problems, thus realizing a city in to a healthy, safe, comfortable, smart, and intelligent city. free from congestion, competitive and sustainable.

Activities

International Conferences, Scientific Research, Innovation Development, Seminars, Publications, Indonesia Smart City Rating, Training, Workshop, Consultancy, etc.

Documentation Activities

Figure 1 Implementation of Smart Maritime in Indramayu Regency

Figure 2 Participation in the T20 Forum on Digital Transformation for Rural & Maritime Areas

Products

Figure 3 Smart Mobility Solutions Viana Platform Mobility

Figure 4 Smart Mobility Solutions Fleetera

Figure 3 Smart Mobility Solutions Viana Plate Number Recognition

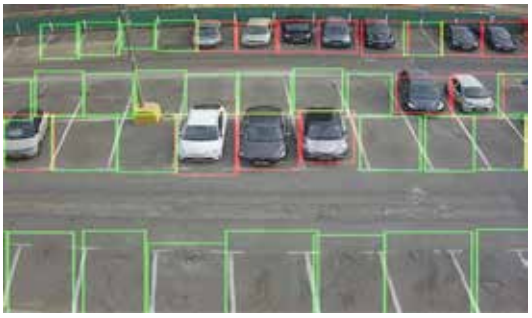


Figure 4 Smart Building Solutions Video Analytics with AI

Other Products

- SMART CITY SOLUTIONS **Skota**
- SMART HEALTH SOLUTIONS **Dianesha Care**
- SMART INFRASTRUKTUR SOLUTIONS **Road Condition Surveys Platform**
- SMART ENVIRONMENT SOLUTIONS **Waste Management**
- SMART EDUCATION SOLUTIONS **Eduplatform**
- SMART SAFE & SECURE SOLUTIONS **VIANA Safe & Secure**
- SMART FARMING SOLUTIONS **IoT Smart Watering System**
- SMART UMKM SOLUTIONS **Pangusaha**
- SMART MARITIME SOLUTIONS **IoT Penangkapan Terukur**

Prof. Dr. Ir. Suhono H. Supangkat
Head of SCCIC
suhono@stei.itb.ac.id

04

National Center for Sustainable Transportation Technology

Gedung CRCS Lt.2, Ganesha 10 Bandung | Website: ncstt.itb.ac.id | Email: contact@ncstt.itb.ac.id

A sustainable transportation system is defined as one that is accessible, safe, comfortable, environmentally friendly, and affordable. The current transportation system in Indonesia is marked by several issues that need to be addressed promptly: 1) high levels of traffic congestion, 2) dependence on non-renewable energy sources, 3) high levels of pollution. These three conditions are indicative of an unsustainable transportation system. Therefore, the National Center for Sustainable Transportation Technology (NCSTT) was established to provide integrated transportation solutions in Indonesia.

Electric vehicle-based transportation systems, mass rail transit, and aviation are the three main systems that can be developed to achieve an integrated and sustainable transportation system. The transportation industry in Indonesia holds a very strategic position in the Indonesian economy as it is the backbone of economic development. The automotive, railway, and aviation industries have an economic multiplier effect of 11, meaning that for every engineer in an Original Equipment Manufacturer (OEM), 11 other engineers are created in Tier 1–4 suppliers. The transportation industry market in Indonesia, such as the automotive industry, is growing rapidly. Unfortunately, the local automotive industry has not played a significant role in engineering and design activities. Currently, automotive suppliers in Indonesia are only involved at the end of the assembly process, resulting in an economic multiplier effect of just 1. The role of the domestic automotive industry has so far been merely supportive and passive in the national transportation industry.

Figure 1 Electric Bus

Figure 2 E-Trike

Other Products

Technology
- Electric Vehicle
- Mass Transport
- Aircraft

Infrastructure
- Road and railway
- Charging infrastructure

Policy & Planning
- Integrated transportation planning
- Policy and regulation on transportation

Training & Education
- Transport experts
- Transport Curriculum

Event

- NCSTT organized a Battery Technology Workshop for Electric Vehicles to address the current issues in the transportation sector. (02/03/2022)
- NCSTT held a workshop on Electric Vehicles in Bali to support the Acceleration Program for Battery Electric Vehicles for Road Transportation. (05/18/2022)
- Electric Vehicle Battery Technology Training. (01/31/2022 – 02/02/2022)
- Workshop on Inverter and Electric Motor Repair. (05/05/2022 – 05/06/2022)
- Electric Vehicle Safety Standards. (05/07/2022 – 05/08/2022)
- The 7th International Conference on Electric Vehicle Technology (7th ICEVT 2022). (08/29/2022 – 08/31/2022)

Dr. Ir. Leonardo Gunawan
Head of NCSTT
l.gunawan@itb.ac.id

05

Center of Excellence in Earthquake Science & Technology

Jalan Ganesha 10 Bandung | Website: cest.itb.ac.id

Indonesia is a country with very large potential for disaster, this is because the territory of Indonesia is in the "Ring of Fire" region and is influenced by the activities of 4 major earth plates that interact and form subduction and collision zones, active faults and volcanoes.

In view of this, national needs are needed for leading academic staff who understand the earthquake process and its mitigation at both the central and regional levels. Therefore, ITB as one of the educational and research institutions needs to answer these problems. The research process related to the science and technology of Indonesian earthquakes needs to involve various scientific fields (multidisciplinary and interdisplinary) as well as various parties, PUI-PT Indonesia Earthquake Science and Technology consists of the fields of science and technology and includes subfields of geology, seismology (geophysics), geodesy, geotechnology, earthquake resistant structural technology, as well as computing technology, communication, information and seismic instrumentation.

Vision

Becoming the Center for Excellence in-Science and Technology that produces discoveries and innovations in the development of superior and respected seismic science and technology at the national level as well as internationally recognized and contributes significantly in order to create conditions for Indonesian society that are safer from the threat of disasters, especially catastrophic disasters.

Mission

- Improve and coordinate research activities in the seismic science and technology field at the Bandung Institute of Technology to respond to the threat of earthquake disasters and reduce their risks.

- Active socialization to increase public awareness of the potential for earthquake disasters and increase their capacity to deal with it.

- Provide input, for earthquake disaster management policies in the context of sustainable development, based on the results of pure and applied research.

- Develop seismic science and technology expertise through research-based post-graduate education programs.

Programs

Educations

- Part of ASALUs (ASEAN Alliance Universities) in the "Consortium of International Human Resource Development for Construction of Disaster Resilient Countries" program.
- The involvement of undergraduate and post-graduate students in various ITB Featured Research activities

Community Outreach

- Part of the University Forum for disaster risk reduction (FPT-PRB) in the activities of the Institutionalizing Disaster Preparedness and Management Capacity of BPBDs in Indonesia through Technical Assistance and Training Teams (TATTs).

Research

- Development of the 2010 and 2017 National Earthquake and Hazard Maps· Development of SNI 1726: 2012 and updating SNI 1726: 2018 related to Procedures for Planning Earthquake Resilience for Building Structure
- Development of Technical Guidelines (Tsunami Immersion Hazard Maps, Planning of Tsunami Temporary Evacuation Sites (TES), Design of Tsunami TES Building Structures and Hill Design as Tsunami TESTs).

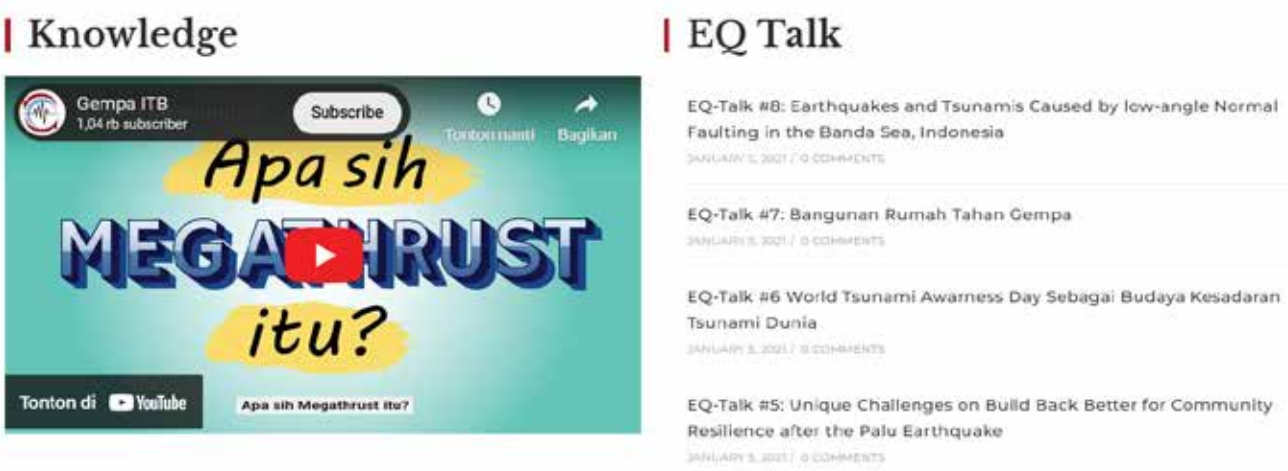


Figure 1 EQ Talk (one of the CEST ITB activities)

Dr. Zulfakriza, M.T.
Head of CEST
zulfakriza@itb.ac.id

06

Center of Excellence in Carbon Capture Storage & Carbon Capture, Utility, & Storage

Basic Science Center B Building, 3rd floor | ccs-coe.fttm.itb.ac.id | Email: coe-ccus@fttm.itb.ac.id

PPKDGS had been involved in several activities and created products that support the implementation of carbon dioxide utilization in Indonesia:

Finalization of Draft on Regulation Ministry of Energy and Mineral Resources

The Draft on Regulation of has been worked on since 2021 and finalized on February 2022, the finalization in conjunction with socialization and discussion with industries, government, and even overseas institution such as IEAGHG and CO2CRC.

Collaboration Study

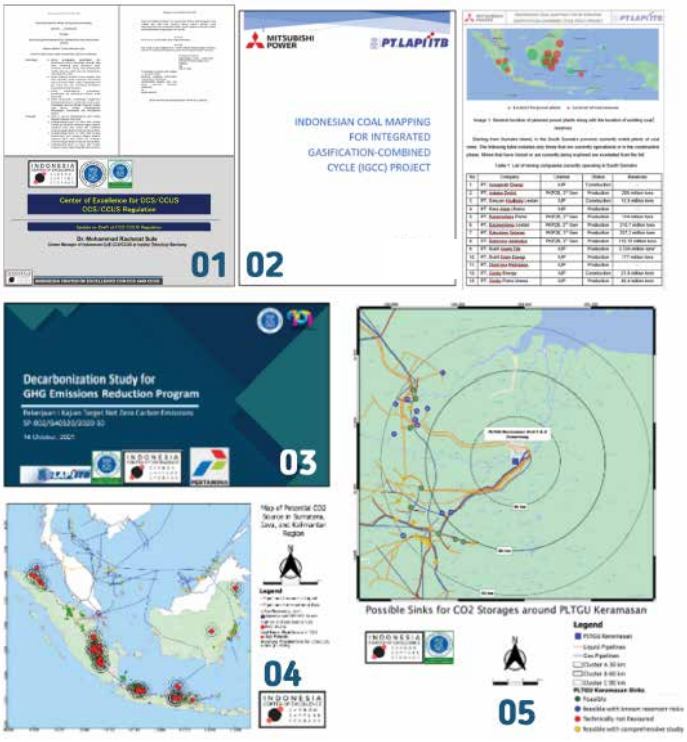
The research team member is also actively involved in several collaboration studies with industry. Our study mainly focused on decarbonization and implementation of CCS/CCUS to high-produced CO2 industry. Currently, the continuation of the study last year are: CCS study for Banggai Ammonia Plant, PT Kaltim Parna Industry, Joint Research with Mitsubishi Heavy Industries, INPEX Masela

Our main objectives are:

1. To deliver a coordinated program of CCS research that links government, industry, regulators, and research organizations
2. To demonstrate CCS/CCUS pilot project in Indonesia and to identify opportunities of CCS implementation for the achievement of Indonesia target to contribute to global climate change mitigation
3. To formulate Policies, Strategy, Regulations/Standards for the Enabling of CCS Implementation in Indonesia
4. To develop effective communication links and networks with CCS researchers, regulators, policy makers and other stakeholders in Indonesia
5. To provide educational and information materials to partners and general public to promote public awareness and understanding of CCS as a critical greenhouse gas mitigation.

Figure 1 Carbon Capture

Innovation Products



1. The Draft on Peraturan Menteri Energi dan Sumber Daya Mineral Tahun 2022 Tentang Penyelenggaraan Penangkapan, Pemanfaatan, dan Penyimpanan Karbon
2. Indonesian Coal Mapping for Integrated Gasification-Combined Cycle (IGCC) Project
3. Decarbonization Study For Green House Gases Emission Reduction Program
4. Indonesia CO2 Source - Sinks Spatial Database
5. Indonesia CO2 Source - Sinks Spatial Database

Prof. Dr. Ir. Djoko Santoso, M.Sc.
Head of CCS/CCUS
dsantoso@itb.ac.id

07

Research Center for Nanoscience & Nanotechnology

Gedung CAS LT.1 | nrcn.itb.ac.id | Email: nanocenter.itb@gmail.com

The Research Center for Nanosciences and Nanotechnology is a Research Center that focuses on activities in the field of nanoscience and nanotechnology. PPNN ITB was established in response to the complex challenges of modern times and to reaffirm ITB's commitment to continuously conduct research, development, and application of the latest science and technology for the advancement of the Indonesian nation. PPNN ITB believes that with the increasing complexity of problems faced by society, an interdisciplinary approach is very necessary. PPNN ITB, with the slogan "Advanced Interdisciplinary Technology for a Better Future," is determined to make comprehensive efforts to maintain the rich and dynamic fusion of the academic backgrounds of its researchers as a strong vehicle to face future challenges and fully fulfill its mission.

The scope of activities and research at PPNN ITB covers a wide spectrum of science and technology disciplines. There are five (5) research focus areas at PPNN ITB: Nanosciences, Nano Medicine, Nano Devices, Nanomaterial for Energy and Industry Purpose, and Nano Biology and Environment. Each research area has expert researchers from various Faculties and Schools at ITB, as well as more than 100 active students involved in research and education activities based on nanoscience and nanotechnology. PPNN ITB is also equipped with state-of-the-art material characterization equipment such as High-Resolution Transmission Electron Microscope (HRTEM), Focused Ion Beam (FIB), Scanning Electron Microscope (SEM), and Atomic Force Microscope (AFM) to support research, education, and community service activities within it.

Figure 1 RCNN Research Roadmap

The long-term outcomes of activities at PPNN-ITB are as follows:

- Introduction and understanding of nanotechnology among the wider community
- Creation of applied product innovations resulting from research related to research directions
- Increase in the number of products and patents from research that can be utilized by the wider community
- Human resources with knowledge in the field of nanotechnology who have global competitiveness
- Improvement in the quality of performance and activities of PPNN ITB researchers
- Commercialization of research products through industrial collaboration
- Development of SMEs and fostered communities.

Innovation Products

1. Sabun Najis
2. Hi-Imun (Suction tablets contain ciplukan fruit extract and propolis extract)
3. Anti aging serum with physalis peruviana derived exosome like particle
4. Bidari (Biskuit Darurat Indonesia, disaster biscuits contain a combination of catfish flour, black garlic flour and nutmeg powder)

Prof. Dr. apt. Heni Rachmawati
Head of RCNN
heni@fa.itb.ac.id

08

Center of Excellence in Nutraceutical

Gedung PAU Lantai 2 | bbrc.itb.ac.id | Email: admin@bbrc.itb.ac.id

Nutraceutical is a combination of the words nutrition and pharmaceutical, referring to any form of food that has health effects and is used for preventive purposes as well as aiding in the treatment of various diseases. Based on regulations, nutraceuticals, also known as functional foods, are governed differently from ordinary foods and pharmaceutical products.

To address the challenges of developing nutraceutical products, the Center for Biosciences and Biotechnology Research (PPBB ITB) proposes a Center of Excellence in Science and Technology (PUI) with a focus on nutraceuticals. Indonesia is a significant nutraceutical market globally, marked by the abundance of nutraceutical products available in the national market, both imported and locally produced. Research supporting the development of nutraceutical products in Indonesia has also begun to grow, while raw materials for nutraceutical products are abundant in Indonesia, in addition to those obtained from the development of biotechnology products.

Based on the explanation above, PPBB has a strong urgency to establish a-leading research center in the field of nutraceuticals. This excellence center will serve as a powerful driver for the development of nutraceutical products produced by domestic research to be utilized by both Indonesian and global communities. The establishment of this center will enhance the performance of the PPBB institution with output parameters in the form of implementable products and scientific publications both nationally and internationally.

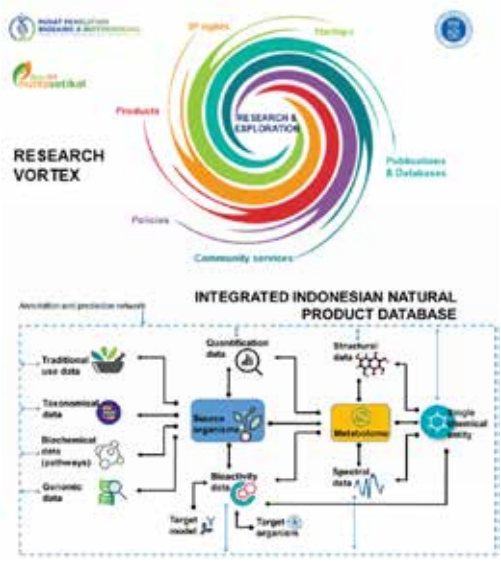
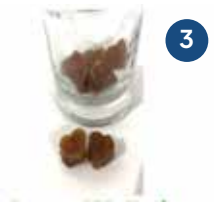


Figure 1 Research & Exploration

Innovation Products



1. Kaffir Oil, contains natural extracts from oranges
2. Nutmeg oil, extract contains natural extracts from nutmeg
3. Cassava CBD Gummy, Candy product based on cassava extract
4. MarkHerb

Achievements

ICOMB 2022 (plenary speaker)	Prof. Dr. apt. Elfahmi
Virtual Conference Black Soldier Larva Hongkong China, 2022 (Invited Speaker)	Dr. Muhammad Yusuf Abduh
International Webinar Medical Herb 2022 (Invited Speaker)	Dr. Husna Nugrahapraja
WESTAC 2022 (pemakalah internasional)	Dr. Muhammad Yusuf Abduh
EFB 2022	Dr. Muhammad Yusuf Abduh
OMICS 2022 (Pemakalah)	Dr. Muhammad Yusuf Abduh, Laode M.R.A., Ph.D, Adrian S Siregar, Ph.D

Prof. Dr. Elfahmi, S.Si., M.Si.
Head of Center of Excellence in Nutraceutical
elfahmi@itb.ac.id

09

Center of Excellence in Defense & Security Technology

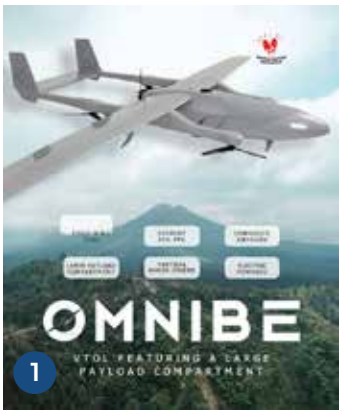
Gedung PAU Lantai 1, Ganesha 10 Bandung | pustekhan.itb.ac.id | Email: pustekhan@itb.ac.id

The Defense and Security Technology Center at the institut Teknologi Bandung (PUSTEKHAN ITB) is a Center of Excellence in Science and Technology (PUI IPTEK) and research based in a higher education institution. PUSTEKHAN ITB focuses on coordinating defense and security research and development (R&D) activities, both in technology and policy. Additionally, PUSTEKHAN ITB plays a strategic role in orchestrating defense and security R&D activities conducted in collaboration with the PUSTEKHAN ITB ecosystem, including academics, businesses and industries, government as policymakers, and the media to articulate PUSTEKHAN ITB's vision and narrative.

In 2023, PUSTEKHAN ITB is focused on becoming an ecosystem hub. This vision is manifested in collaborative activities with a broader and more varied range of entities. Through various collaboration schemes, PUSTEKHAN ITB initiates diverse innovations and joint developments with industrial partners. Some examples of these initiatives include the Kedaireka Matching Fund 2023 grant program with industrial partners such as PT PINDAD and PT Robo Marine Indonesia, as well as innovation collaborations through the Research and Innovation for Advanced Indonesia (RIIM) program with the National Research and Innovation Agency (BRIN) for downstreaming PUSTEKHAN ITB's technological innovation products.

Figure 1 Raybe: Mapping Drone (Designed for complex aerial mapping challenges in rugged terrains)

Other Innovation Products



1. Omnibe (Surveillance Drone), is engineered for extensive aerial surveillance
2. Iris (Multipurpose Drone)
3. Feia16 (Spraying Drone), the agricultural spraying drone with a 16L tank capacity.
4. Rajaampat Rov, Deep Sea Light Working Class Rov
5. Kaledupa, Observation and Inspection Rov
6. Remora, Semi Closed Circuit Rebreather
7. etc.

Achievements Being one of the leading centers of science and technology (IPTEK) at the national level in the fields of defense, security, and resilience; In developing Pustekhan products, we always collaborate with state-owned enterprises (BUMN) and private entities such as PT LEN, PINDAD, and Robomarine; In collaboration with KEMENDIKBUDRISTEK, PUSTEKHAN strives to present the best domestically-made products.

Dr. Ir. Djarot Widagdo
Head of Pustekhan ITB
pustekhan@itb.ac.id

Laboratory

Biochemistry and Biomolecular Engineering

Laboratory

Biochemistry Biomolecular Engineering Laboratory, under the Biochemistry and Biomolecular Engineering Research Group of the Faculty of Mathematics and Natural Sciences Institut Teknologi Bandung (FMIPA-ITB) has 14 lecturers, each with specialized expertise in biochemistry and the engineering of various biomolecules. In 2023, we transformed from the Biochemistry Research Group to the Biochemistry and Biomolecular Engineering Research Group to better reflect our growing membership and expanding research topics. Our research roadmap is meticulously designed around the core competencies of each member, focusing on the types, functions, applications, and sources of the biomolecules we study. This evolution underscores our commitment to advancing scientific knowledge and addressing global challenges.

Our research are specifically in subject of proteins and enzymes, genes, lipids, carbohydrates, and renewable biomaterials derived from Indonesia's biodiversity. All members are highly dedicated to both research and community service, as evidenced by the various prestigious awards they have received. We also actively participate as speakers in various scientific events and serve as reviewers for national and international scientific journals. The Biochemistry and Biomolecular Engineering Research Group also regularly organizes scientific meetings, such as The Gruber-Soedigdo Lecture (GSL) and various instrumentation workshops for biomolecular studies. These accolades highlight the significant contributions and achievements in both scientific exploration and community engagement.

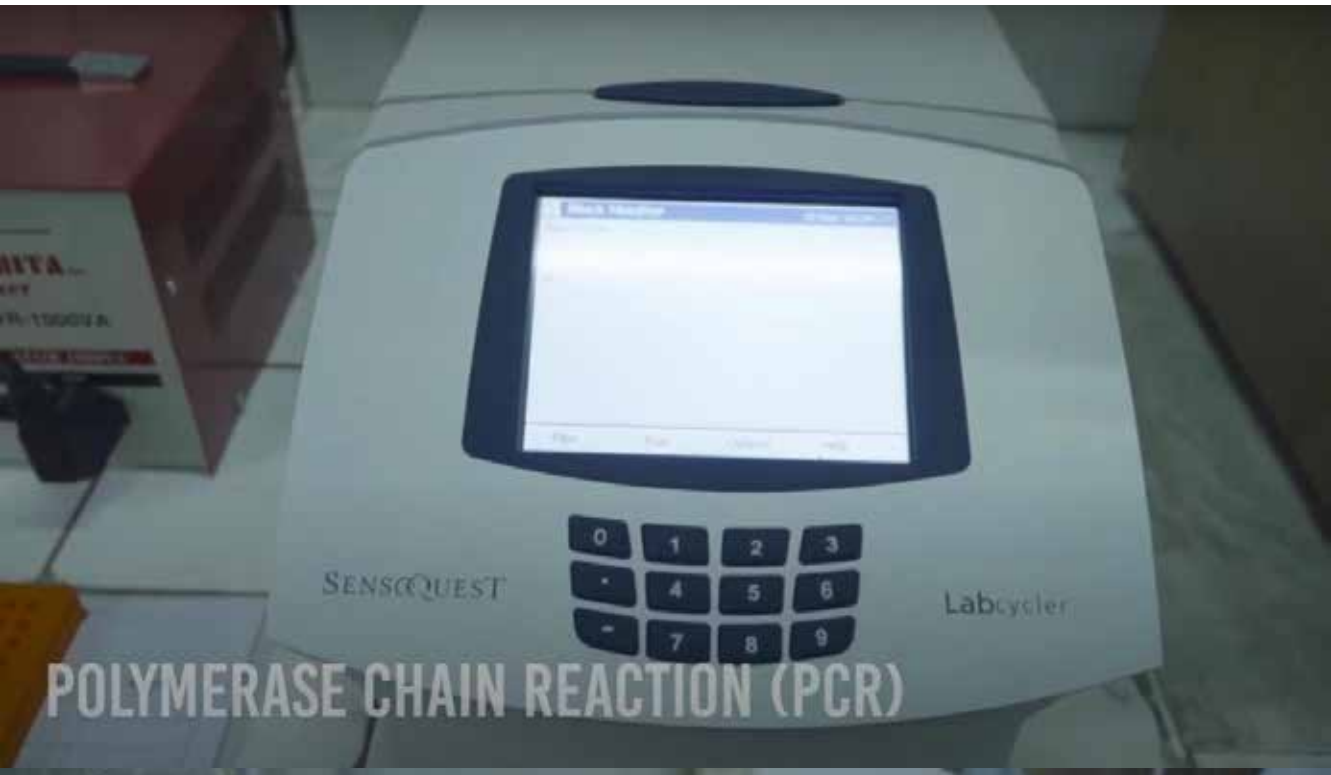
Our members are consistently active in various Tridharma Perguruan Tinggi activities, including teaching and education, student supervision (both undergraduate and postgraduate), research, and community service. Over the past five years, Biochemistry and Biomolecular Engineering Research Group members have actively published scientific works in various reputable international journals, particularly Q1 and Q2 journals, and have produced numerous patents and books. These works are the output of various competitive research grants obtained by our members from government institutions such as the Ministry of Education, Culture, Research, and Technology, Indonesian Collaborative Research, BRIN, and internal ITB sources (such as ITB Research, P2MI KK Research, and International Research), as well as non-governmental organizations like The Asahi Glass Foundation and L'Oreal-UNESCO.

Biochemistry laboratory has been actively and consistently perform educational activities for Biochemistry Final Project students, the Chemistry Study Program and Masters in Chemistry Teaching, as well as serving SITH-ITB and STEI-ITB Biomedical Engineering students. To achieve safe and conducive practical activities, the Biochemistry Laboratory equips itself by providing the proper equipment and instrumentation. In addition, our laboratory also provides complete work instructions for each equipment and improves laboratory management in the form of Operational Standards for the successful implementation of activities in the biochemistry laboratory.

Despite facing challenges with the adequacy of routine and specialized equipment due to the high number of students conducting final projects and research at the master's and doctoral levels, we remain optimistic. We are actively seeking support from ITB to procure essential routine equipment and also advanced specialized equipment, including FPLC protein purification systems and bioreactor (fermentor), to further enhance our research capabilities. Our laboratory is dedicated to advancing scientific knowledge and developing innovative solutions to address global challenges in food, health, energy, and the environment. Through our commitment to education and research excellence, community service, and collaboration, we aimed to make a meaningful impact on society and contribute to the sustainable development in our field.

Research Facilities

Research Facilities



POLYMERASE CHAIN REACTION (PCR)

FAST PERFORMANCE LIQUID CHROMATOGRAPHY (FPLC)

Academic Activities

The Biochemistry Laboratory is dedicated to organizing academic activities, consistently providing educational support for students working on their Biochemistry Final Projects, as well as those in the Chemistry Study Programs and Chemistry Teaching Masters Programs. Additionally, we also serves practical laboratory for SITH-ITB and STEI-ITB Biomedical Engineering students.

Biochemistry Laboratory is equipped with adequate instruments and equipment. We provide comprehensive work instructions for each equipment and also enhances laboratory management through detailed Operational Standards, ensuring the health and safety environment for all activities within the lab.

Collaboration

To strengthen our research performance in both basic and applied research, our members collaborate with various institutions and industries, both domestically and internationally. These collaborations enhance the quality and impact of our research, fostering innovation and practical applications. Our research group has established an extensive network of collaborations with various institutions both domestically and internationally. Notably, at the end of 2023, we initiated a collaboration with the RIKEN research institute in Japan, starting with a Mini Symposium with ITB and RIKEN. In the initial phase of this collaboration, agreements were reached, including a two-month research internship for an undergraduate student at RIKEN, a research topic related to biomaterials, and the preparation of a draft Memorandum of Agreement (MOA). This collaboration is expected to provide opportunities for Sandwich programs for master's and doctoral students.

ITB Innovation Park

ITB Innovation Park

ITB Innovation Park

As the center of the innovation ecosystem, **ITB Innovation Park strengthens collaboration** with innovation resources at ITB as well as universities, research institutions, industry, entrepreneurs, investors and government.

Our Website

Co-Working Space

Ruang Ko-Kreasi is a co-working space belonging to ITB Innovation Park which is located on the 4th floor of the ITB Innovation Park building with a total area of 210m² and provides various facilities that can support your productivity.

Our Facilities

- Pantry
- Working Spaces
- Locker
- Free Flow drinks
- Customer Service
- Wifi

If you order a shared desk, you can choose an available work desk to do your work.

External Rental Price

Rp50.000/day
Rp700.000/month
Rp1.800.000/3 month

Internal Rental Price

Rp35.000/day
Rp350.000/month
Rp900.000/3 month

External Rental Price

Rp3.00.000/3 month

Internal Rental Price

Rp2.100.000/3 month

Awards

Top 100 ITB Researchers Based on H-Index in the AD Scientific Index

No	Nama	H-Index
1	**Ferry Iskandar** FMIPA	49
2	**I Gede Wenten** FTI	42
3	**Hasanuddin Z Abidin** FITB	37
4	**Djoko T Iskandar** SITH	35
5	**Tommy Firman** SAPPK	35
6	**Afriyanti Sumboja** FTMD	34
7	**Brian Yuliarto** FTI	34
8	**Mikrajuddin Abdullah** FMIPA	33
9	**Rino R Mukti** FMIPA	33
10	**Kiki Adi Kurnia** FTI	32
11	**Sri Widiyantoro** FTTM	31
12	**Togar M Simatupang** SBM	30
13	**Edy Tri Baskoro** FMIPA	30
14	**Agustinus Agung Nugroho** FMIPA	29
15	**Yana Syah** FMIPA	28
16	**K Khairurrijal** FMIPA	27
17	**I Ketut Adnyana** SF	27
18	**Elin Yulinah Sukandar** SF	27
19	**Irwan Meilano** FITB	27
20	**Euis Holisotan Hakim** FMIPA	27
21	**Satria Bijaksana** FTTM	27
22	**Hamzah Latief** FITB	26
23	**Rudi Dungani** SITH	25
24	**Khoiruddin** FTI	25
25	**Antonius Indarto** FTI	25
26	**Rinaldi Munir** STEI	23
27	**Yasraf A Piliang** FSRD	23
28	**Heri Andreas** FITB	23
29	**Muhammad Miftahul Munir** FMIPA	23
30	**Irda Fidrianny** SF	23
31	**Rahmat Hidayat** FMIPA	23
32	**Anm Salman** FMIPA	23
33	**Sigit Haryadi** STEI	23
34	**Enri Damanhuri** FTSL	22
35	**Mitra Djamal** FMIPA	22
36	**Trio Adiono** STEI	22
37	**Veinardi Suendo** FMIPA	22
38	**Dwi H Widyantoro** STEI	22
39	**Heni Rachmawati** SF	21
40	**Wawan Dhewanto** SBM	21

Top 100 ITB Researchers Based on H-Index in the AD Scientific Index

No	Nama	H-Index
41	**Masyhur Irsyam** FTSL	21
42	**Reza Maha** FMIPA	21
43	**Lia Dewi Juliawaty** FMIPA	21
44	**Taufiq Hidayat** FTTM	21
45	**Ayu Purwarianti** STEI	20
46	**Rinovia Simanjuntak** FMIPA	20
47	**Tjandra Setiadi** FTI	20
48	**Muhammad Iqbal** FTI	20
49	**Agus Sachari** FSRD	19
50	**Kadarsah Suryadi** FTI	19
51	**Pekik Argo Dahono** STEI	19
52	**Robert Manurung** SITH	19
53	**Hermawan K Dipojono** FTI	19
54	**Delik Hudalah** SAPPK	19
55	**Edy Soewono** FMIPA	19
56	**Rajesri Govindaraju** FTI	19
57	**Muhammad Yusuf Abduh** SITH	19
58	**Bambang Riyanto Trilaksono** STEI	18
59	**Hendra Gunawan** FMIPA	18
60	**Zaki Su'Ud** FMIPA	18

No	Nama	H-Index
61	**Conrad William Watson** SBM	18
62	**Andri Dian Nugraha** FTTM	18
63	**Freddy Haryanto** FMIPA	18
64	**Haryo Winarso** SAPPK	18
65	**Suprihanto Notodarmojo** FTSL	18
66	**Idam Arif** FMIPA	18
67	**Endra Gunawan** FTTM	18
68	**Deana Wahyuningrum** FMIPA	18
69	**CB Rasrendra** FTI	17
70	**Sigit P Santosa** FTMD	17
71	**Andriyan Bayu Suksmono** STEI	17
72	**Suhono Supangkat** STEI	17
73	**Ismunandar** FMIPA	17
74	**Lysta Sirait** SBM	17
75	**Made Tri Ari Penia Kresnowati** FTI	17
76	**Gede Suantika** SITH	17
77	**Prawira Fajarindra Belgiawan** SBM	17
78	**Tatacipta Dirgantara** FTMD	17
79	**Dzulianur Mutsla** SITH	17
79	**Kamarisima** SITH	17

Top 100 ITB Researchers Based on H-Index in the AD Scientific Index

No	Nama	H-Index	No	Nama	H-Index
81	**Masayu Leylia Khodra** STEI	17	91	**Nanang T Puspito** FTTM	16
82	**Pingkan Aditiawati** SITH	17	92	**Saut Sagala** SAPPK	16
83	**Houw Theh** FMIPA	17	93	**Muhammad İhsan** FSRD	16
84	**Endra Joelianto** FTI	17	94	**Zulfan Adi Putra** FTI	16
85	**Grandprix TM Kadja** FMIPA	17	95	**Muhammad Ali Zulfikar** FMIPA	16
86	**Danu Ariono** FTI	17	96	**Nuning Nuraini** FMIPA	16
87	**Daryono Hadi Tjahjono** SF	17	97	**Aqsha Aqsha** FTI	16
88	**Yudi Darma** FMIPA	17	98	**Arry Akhmad Arman** STEI	16
89	**Dwi Hantoko** FTI	17	99	**Adhitya Gandaryus Saputro** FTI	16
90	**Budi Rahardjo** STEI	16	100	**Iswandi Imran** FTSL	15

The World's Top 2% Scientist 2023 versi Stanford University

1	**Prof. Tommy Firman**	School of Architecture, Planning and Policy Development (SAPPK)
2	**Prof. I Gede Wenten**	Faculty of Industrial Technology (FTI)
3	**Prof. Ferry Iskandar**	Faculty of Mathematics and Natural Sciences (FMIPA)
4	**Prof. Brian Yuliarto**	Faculty of Industrial Technology (FTI)
5	**Prof. Suwarno**	School of Electrical Engineering and Informatics (STEI)
6	**Dr. Ir. Rudi Dungani**	School of Life Sciences and Technology (SITH)
7	**Prof. Heni Rachmawati**	School of Pharmacy (SF)
8	**Prof. Pekik A. Dahono**	School of Electrical Engineering and Informatics (STEI)

ITB Top 10 Young Academia 2023

1	**Dr. Anjar Dimara Sakti**	Faculty of Earth Sciences and Technology (FITB)
2	**Isa Anshori, Ph.D.**	School of Electrical Engineering and Informatics (STEI)
3	**Dr. Firman B. Juangsa**	Faculty of Mechanical and Aerospace Engineering (FTMD)
4	**Dr. Anton Timur Jaelani**	Faculty of Mathematics and Natural Sciences (FMIPA)
5	**Dr. Megawati Zunita**	Faculty of Industrial Technology (FTI)
6	**Dr. Bentang A. Budiman**	Faculty of Mechanical and Aerospace Engineering (FTMD)
7	**Dr. Ikha Magdalena**	Faculty of Mathematics and Natural Sciences (FMIPA)
8	**Pramudita S. Palar, Ph.D.**	Faculty of Mechanical and Aerospace Engineering (FTMD)
9	**Taufiq Hidayat, Ph.D.**	Faculty of Mining and Petroleum Engineering (FTTM)
10	**Ganes Shukri, Ph.D.**	Faculty of Industrial Technology (FTI)

Recipient of the Overseas Research Grant, The Asahi Glass Foundation 2023

1	**Dr. Asep Saepuloh**	Faculty of Earth Sciences and Technology (FITB)
2	**Dr. Nuning Nuraini**	Faculty of Mathematics and Natural Sciences (FMIPA)
3	**Dr. Rukman Hertadi**	Faculty of Mathematics and Natural Sciences (FMIPA)
4	**Prof. Wahyu Srigutomo**	Faculty of Mathematics and Natural Sciences (FMIPA)
5	**Rindia Maharani Putri, Ph.D.**	Faculty of Mathematics and Natural Sciences (FMIPA)
6	**Dr. Made Tri Ari Penia**	Faculty of Industrial Technology (FTI)
7	**Wibawa H. Saputera, Ph.D.**	Faculty of Industrial Technology (FTI)
8	**Poetro H. Sambegoro, Ph.D.**	Faculty of Mechanical and Aerospace Engineering (FTMD)

Recipient of the Overseas Research Grant, The Asahi Glass Foundation 2023

9	**Prof. Satria Bijaksana**	Faculty of Mining and Petroleum Engineering (FTTM)
10	**Dr. Endra Gunawan**	Faculty of Mining and Petroleum Engineering (FTTM)
11	**Nurrohman Wijaya, Ph.D.**	School of Architecture, Planning, & Policy Development (SAPPK)
12	**Santi Novani, Ph.D.**	School of Business and Management (SBM)
13	**Dr. Muhammad Yusuf Abduh**	School of Life Sciences and Technology (SITH)
14	**Husna Nugrahapraja, Ph.D.**	School of Life Sciences and Technology (SITH)

Recipient of the Palm Oil Research Grant Program Fund 2023

1	**Prof. Dr. Ir. Yogi Wibisono, M.T.**	Faculty of Industrial Technology (FTI)
2	**Prof. Dr. Lienda Aliwarga, M.Eng.**	Faculty of Industrial Technology (FTI)
3	**Prof. Dr.-Ing. Mitra Djamal**	Faculty of Mathematics and Natural Sciences (FMIPA)

Science and Technology Research Grant Recipients Indonesia Toray Science Foundation 2023

1	**Dr. Eng. Sari Dewi Kurniasih**	Faculty of Mathematics and Natural Sciences (FMIPA)
2	**Ekavianty Prajatelistia, Ph.D.**	Faculty of Mechanical and Aerospace Engineering (FTMD)

Winner of L'OREAL-UNESCO for Women In Science 2023

1	**Karila Meitha, Ph.D.**	School of Life Sciences and Technology (SITH)
2	**Dr. Fitri Aulia Permatasari, M.Eng.**	Faculty of Mathematics and Natural Sciences (FMIPA)

Honorary Fellowship and Lectureship Royal Astronomical Society (RAS) Award 2023

1	**Dra. Premana W. Premadi, Ph.D.**	Faculty of Mathematics and Natural Sciences (FMIPA)

Winner ASEAN Coals Awards – Corporate Social Responsibility Small Category – 2023

1	**PT Duta Tambang Rekayasa – MEMI**	Mitra Pengabdian Masyarakat ITB

Indonesia Geospatial Award : Young Inspirational HxGN Live Indonesia 2023

1	**Prof. Dr. Irwan Meilano**	Faculty of Earth Sciences and Technology (FITB)

Outstanding Young Lecturer

Dr. Eng.

Anjar Dimara Sakti,

S.T., M.Sc.

Faculty of Earth Sciences and Technology

Anjar Dimara Sakti currently serves as an Assistant Professor at the Geographic Information Sciences and Technology Research Group, Faculty of Earth Sciences and Technology, Institut Teknologi Bandung, and holds the position of Vice Director at the Center for Remote Sensing, Institut Teknologi Bandung.

Anjar completed his undergraduate studies in the Department of Geodesy and Geomatics Engineering at ITB in 2013, followed by his Master's and Doctoral degrees at The University of Tokyo, Japan, in 2015 and 2018, respectively. He joined ITB as a faculty member in 2019. In addition to his teaching role, Anjar actively collaborates as an international researcher, including positions as a Visiting Research Fellow at the Department of Geography, King's College London, and as a Visiting Project Researcher at the Department of Land Economy, University of Cambridge.

His expertise lies in integrated environmental and geospatial intelligence systems. His research focuses on developing strategic geospatial products at global, regional, and local levels based on long-term satellite Earth observation data. Some of the spatial models he has developed include calculations for renewable energy potential, estimates of air and water pollution emissions, assessments of carbon content in multiple ecosystems, and optimizations for sustainable infrastructure development.

During his tenure at ITB, Anjar has authored 76 Scopus-indexed scientific papers, with 37 of them published in top-tier Q1 journals. His recent publications explore applied Earth observation satellite applications and geospatial intelligence for sustainability studies:

Sakti, A.D., et al. Spatial Integration Assessment of Solar, Wind, and Hydropower Energy Potential in Southeast Asia. Scientific Report. 2023, 13, 340. (Nature)

Sakti, A.D., et al. Multi-air pollution risk assessment in Southeast Asia region using integrated remote sensing and socio-economic data products. Science of The Total Environment 2023, 854, 2023. (Elsevier)

Sakti, A.D., et al. Identification of Illegally Dumped Plastic Waste in a Highly Polluted River in Indonesia Using Sentinel-2 Satellite Imagery. Scientific Report. 2023, 13, 5039. (Nature)

Sakti, A.D., et al. Spatial network optimization for centralized wastewater treatment development at the city level in Bandung, Indonesia. Environmental Technology & Innovation. 2023, 32, 103360. (Elsevier)

Sakti A.D., et al. Machine learning-based spatial data development for optimizing astronomical observatory sites in Indonesia. PlosOne. 2023, 18, 10, e0293190. (PLOS)

Sakti, A.D., et al. Machine learning based urban sprawl assessment using integrated multi-hazard and environmental-economic impact. Sientific Report. 2024, 14, 13385. (Nature)

Isa Anshori,

S.T., M.Eng., Ph.D.

School of Electrical Engineering and Informatics

Isa Anshori received B.Eng. degree from Engineering Physics in 2009. He then continue his graduate studies and received his M.Eng. degree in Materials Science and Ph.D. degree from Nano-Science and Nano-Technology at the Graduate School of Pure and Applied Sciences, University of Tsukuba, Japan, in 2015 and 2018, respectively. After his graduate studies, he joined as an Assistant Professor in Biomedical Engineering Department, School of Electrical Engineering and Informatics, Institut Teknologi Bandung since 2018. His current research interests include bio/chemical sensors, microfluidics, IoT devices, and lab-on-chip technologies.

Currently, he has Scopus H-index of 11. He has published 45 Scopus-indexed international journals, with 28 of them published in Top Tier Q1 Journals. These publications had diverse scopes in nanotechnology, biochemical sensors, microfluidics, bioinformatics, and sensor reader/instrument. Several of his notable publications, such as:

Majidah, Salma, Lavita Nuraviana Rizalputri, Eduardus Ariasena, Aldyla Nisa Raditya, Bejo Ropii, Nadia Salsabila, Uperianti, Murni Handayani, Yeni Wahyuni Hartati, and Isa Anshori. "Evaluating bioreceptor immobilization on Gold Nanospike (AuNS)–modified Screen-Printed Carbon Electrode (SPCE) as enzymatic glucose biosensor." Nanocomposites 10, no. 1 (2024): 139–151.

Ropii, Bejo, Maulidwina Bethasari, Isa Anshori, Allya Paramita Koesoema, Wervyan Shalannanda, Ardianto Satriawan, Casi Setianingsih et al. "The molecular interaction of six single-stranded DNA aptamers to cardiac troponin I revealed by docking and molecular dynamics simulation." Plos one 19, no. 5 (2024): e0302475.

Handayani, Murni, Hendrik, Aumber Abbas, Isa Anshori, Rahmat Mulyawan, Ardianto Satriawan, Wervyan Shalannanda et al. "Development of graphene and graphene quantum dots toward biomedical engineering applications: A review." Nanotechnology Reviews 12, no. 1 (2023): 20230168.

Anshori, Isa, Febricetta Zahraketzia Sarwono, Muhammad Azhar Fa'iq, Narendra Kurnia Putra, Joko Suwardy, Agnes Purwidyantri, and Briliant Adhi Prabowo. "From Design to Performance: 3D Printing-Enabled Optimization of Low-Cost Droplet Microfluidics." IEEE Sensors Journal (2023).

Anshori, Isa, Elfrida Vanesa Heriawan, Putri Yulianti Suhayat, Dedy HB Wicaksono, Samuel Priyantoro Kusumocahyo, Ardianto Satriawan, Wervyan Shalannanda, Latifa Dwiyanti, Casi Setianingsih, and Murni Handayani. "Fabric-Based Electrochemical Glucose Sensor with Integrated Millifluidic Path from a Hydrophobic Batik Wax." Sensors 23, no. 13 (2023): 5833.

Anshori, Isa, Iqbal Fawwaz Ramadhan, Eduardus Ariasena, Rikson Siburian, Jon Affi, Murni Handayani, Henke Yunkins, Tomoaki Kuji, Tati Latifah Erawati Rajab Mengko, and Suksmandhira Harimurti. "ESPotensio: A low-cost and portable potentiostat with multi-channel and multi-analysis electrochemical measurements." IEEE Access 10 (2022): 112578–112593.

He received an award from Institut Teknologi Bandung as a young lecturer with a second rank highest number in Q1 journals in 2023. He also received awards from School of Electrical Engineering and Informatics for the highest number of Q1 journals consecutively in 2022 and 2023. During his work, he has received several grants as principal investigator or a member from internal and external campus to support his research activities, such as Riset ITB, Riset Kolaborasi Indonesia, Asahi Research Grant, Riset Internasional ITB, ITB-NTUST Research Program, Matching Fund Kemendikbud, and RISPRO INVITASI LPDP. He has collaborations with researchers from Indonesia and abroad, such as BRIN, Nano Center Indonesia (Dr. Alfian Noviyanto), UNPAD, USU, Queen's University Belfast (Dr. Briliant Adhi Prabowo and Dr. Agnes Purwidyantri), Nanyang Technological University (Dr. Grzegorz Lisak), and National Taiwan University of Science and Technology (Dr. Chih-Yu Chang).

Dr.Eng. Ir.

Firman Bagja Juangsa,

S.T., M.Eng., IPM

Faculty of Mechanical and Aerospace Engineering

Dr. Eng. Firman Bagja Juangsa is currently an Assistant Professor at the Research Group of Thermal Science and Engineering, Faculty of Mechanical and Aerospace Engineering, Institut Teknologi Bandung (ITB), Indonesia. Dr. Firman joined ITB as an Academic Assistant in 2020, progressed to Academic Staff in 2021, and was appointed Assistant Professor in April 2022. He holds a Bachelor's degree in Mechanical Engineering from ITB (2008) and a Master's and Ph.D. from the Tokyo Institute of Technology, Japan also in Mechanical Engineering (2016 and 2019, respectively). Prior to joining ITB, he spent 11 years in Japan, including 6 years of professional roles in the power generation industry at Toshiba and Hitachi. This diverse background equips him with a broad perspective and deep understanding of power generation and energy systems, enhancing his ability to bridge the gap between theoretical research and practical application.

Dr. Firman's research is centered on sustainable energy, with a focus on thermochemistry and energy conversion phenomena which are heavily involved in power plant decarbonization, non-carbon fuel: production, utilization, combustion, and carbon offset. His work aims to develop advanced solutions for energy systems to minimize environmental impact, improve efficiency, and integrate renewable energy sources effectively. This comprehensive approach ensures a cleaner and more sustainable future for energy production and consumption.

He has published numerous articles in high-impact journals, covering topics such as hydrogen production from biomass, ammonia utilization for power generation, and thermodynamic analysis of energy systems. Selected publications include:

Azaria Haykal Ahmad, Prihadi Setyo Darmanto, and Firman Bagja Juangsa. "Thermodynamic analysis of ammonia co-firing for low-rank coal-fired power plant." International Journal of Sustainable Energy 42, no. 1 (2023): 527–544.

Muhammad Aziz, Firman Bagja Juangsa, Adrian Rizqi Irhamna, Achmad Rofi Irsyad, and Arif Darmawan (2023). Ammonia utilization technology for thermal power generation: A review. Journal of the Energy Institute, 101365.
Triya Setia Febriatna, Prihadi Setyo Darmanto, and Firman Bagja Juangsa (2023). Experimental analysis on calcination and carbonation process in calcium looping for CO2 capture: study case of cement plants in Indonesia. Clean Energy, 7(2), 313–327.

Firman Bagja Juangsa, Axl Sabilirasyad Cezeliano, Prihadi Setyo Darmanto, and Muhammad Aziz. "Thermodynamic Analysis of Hydrogen Utilization as Alternative Fuel in Cement Production." South African Journal of Chemical Engineering (2022): 42, 23–31.

Muhammad Aziz, Arif Darmawan, Firman Bagja Juangsa. “Hydrogen production from biomasses and wastes: a technological review” International Journal of Hydrogen Energy (2021): 46(68), 33756–33781.
Firman Bagja Juangsa, Adrian Rizqi Irhamna, and Muhammad Aziz. “Production of ammonia as potential hydrogen carrier: Review on thermochemical and electrochemical processes.” International Journal of Hydrogen Energy (2021): 46(27), 14455–14477.

Firman Bagja Juangsa, Prihadi Setyo Darmanto, and Muhammad Aziz. "CO2–free power generation employing integrated ammonia decomposition and hydrogen combustion-based combined cycle." Thermal Science and Engineering Progress (2020): 100672.

Dr. Firman has received several awards, including the Young Researcher Award with the most publications at ITB (2021–2023), and multiple best paper and presentation awards at international conferences. He has led significant projects related to carbon offset, biomass cofiring, and feasibility studies for green ammonia and hydrogen utilization.

Dr. Firman actively collaborates with various institutions and organizations on research projects. These include the SATREPS project on hydrogen production and hydrogen-derivative fuel utilization in power plant decarbonization, working with Prof. Mochida from RIKEN Japan, Assoc. Prof. Muhammad Aziz from The University of Tokyo, Jawa Power, BRIN, and other universities in Indonesia, including ITB.

He is also involved in a multi-year research collaboration on non-carbon fuel combustion for gas turbine utilization with MHI Japan, which focuses on developing an experimental combustion test bench. Additionally, his work on carbon offset includes projects on carbon capture in cement plants with ISBI and mineral carbonization with Prof. Nozaki from Tokyo Tech.

In my community service, I focus on advancing sustainable energy technologies, including non-carbon fuel, particularly hydrogen and ammonia. I am involved in developing national hydrogen standards and integrated biomass, ammonia, and hydrogen in thermal power plants to enhance sustainable energy sources. I am also involved in carbon capture projects at coal-fired power plants to minimize environmental impacts. I also joined a solar-powered desalination project in Sumba, demonstrating practical renewable energy applications in remote areas. These initiatives underscore my commitment to promoting sustainable development and improving community resource management.

This profile provides a concise overview of Dr. Firman Bagja Juangsa's academic background, research interests, professional experience, and contributions to the field of sustainable energy technologies.

Partnership Program

Peak Event of Pertamina CoRE ITB 2023 Yields 40 Startups in the Energy Sector

The Innovation and Entrepreneurship Development Institute (LPIK ITB) at Institut Teknologi Bandung collaborated with PT Pertamina Persero to host the peak event of Pertamina CoRE ITB 2023 at the ITB East Hall Building on Thursday (23/11/2023).

The event featured a final presentation contest among 12 startup teams, with expert innovation judges determining the winner of Pertamina CoRE ITB 2023. ITB's Rector Prof. Reini Wirahadikusumah, Ph.D., and the Head of LPIK ITB Ir. R. Sugeng Joko Sarwono, M.T., Ph.D., among other executives, attended the event.

Dr. Irwan Gumilar, S.T., M.Si., Chief Executive of Pertamina CoRE ITB 2023, revealed that 306 students from 25 universities in Indonesia participated in the event. The 10-week series of events included team formation, brainstorming, prototype development, and business models.

Guided by business mentors, coaches, and technical mentors, each team received support in developing prototypes and market validation. LPIK ITB provided co-working space for brainstorming and participant activities, resulting in 40 business concepts within the energy sector.

Dr. Irwan explained that 55 percent of the teams were based on applications and websites, while the remaining 45 percent focused on product development. The focus areas included Geographic Information Systems, Smartgrid, Energy Efficiency, IoT, and more.

The top 12 teams, selected after a rigorous selection process, presented their business products at Pertamina CoRE ITB 2023's peak event. Notable startups among the 12 included Ecostepping, Greenlane, Biomate, Seaboost Tech., Agroflash, Refive, Kelp Me, Alga-e, Opet Tech, Ecolements, Roast Relief, and Debel.

The Non-Government Relations Manager of PT Pertamina (Persero) commended the achievements of the Pertamina CoRE ITB 2023 program. He emphasized the importance of collaboration skills and multidisciplinary mastery for students to create competitive job opportunities.

Prof. Reini Wirahadikusumah expressed her gratitude and pride in students' continuous innovation and multidisciplinary collaboration. She stressed the importance of nurturing curiosity and creativity in the young generation and encouraged participants to go beyond their comfort zones.

The purpose of the Pertamina CoRE ITB program, according to Prof. Reini, is not only to generate ideas but to prioritize the quality of ideas. The executives of ITB, LPIK ITB, and PT Pertamina (Persero) hope that the business ideas developed through this program will contribute to the country's development.

The event featured various awards for the 12 selected teams, including product commercialization recognition, Best Achievement, Best Team, Best Pitch, Best Idea, and the first-place award, which went to BioMate.

InnovFest x Elevating Founders 2024: A Platform for ITB Startups to Strengthen the Innovation Ecosystem

Institut Teknologi Bandung (ITB) took part in the InnovFest x Elevating Founders event, a prestigious platform held as part of the AsiaTech x Singapore exhibition, which took place from Wednesday to Friday (May 29–31, 2024) at the Singapore Expo.

This marked ITB's second time participating as an exhibitor at the event, represented by the ITB Innovation and Entrepreneurship Development Institute (LPIK ITB). For context, InnovFest x Elevating Founders is an event organized by the National University of Singapore (NUS) Enterprise.

The event serves as a platform for startups from various universities and institutions to showcase their innovations and connect with potential investors and partners. Unlike the previous year, this time LPIK ITB also involved ITB Innovation Park in the exhibition.

On this occasion, LPIK ITB and ITB Innovation Park showcased six innovative startups supported by the university's incubation and acceleration programs. These startups were Curaweda, EBM Scitech, Greenlabs, Nasho, Bell Living Lab, and Prosa.ai.

The participation of ITB startups in InnovFest 2024 had a significant impact on their business development. This was also reflected in the support shown by the Indonesian government for several ITB-incubated startups.

During the event, ITB received visits and backing from the Indonesian Embassy in Singapore, the Ministry of Tourism and Creative Economy, the Ministry of Industry, and the Ministry of Education, Culture, Research, and Technology at the ITB startup pavilion.

"That support, for example, opened up new opportunities for Curaweda, which had previously collaborated with the Kasepuhan Palace in Cirebon, West Java, Indonesia, on a pilot project to digitize royal operations using SaaCE (Software as Core Ecosystem)," stated LPIK ITB in an official release.

Notably, the Minister of Tourism and Creative Economy of the Republic of Indonesia, Dr. Sandiaga Salahuddin Uno, B.B.A., M.B.A., expressed interest in Curaweda's initiative after visiting ITB's booth.

In addition to exhibiting, several startups were given the opportunity by NUS Enterprise to pitch their businesses directly to investors. Curaweda's presentation at InnovFest captured the interest of venture capital firms such as Appworks, Cocoon Capital, Living Lab Ventures, Maiora Capital, MSW Ventures, NZTE, Orvel Ventures, WOWS Global, and M Venture.

This collaboration between NUS and ITB is expected to further stimulate innovation and entrepreneurship growth in both Indonesia and Singapore by providing students and startups with opportunities to develop through various international programs and conferences. This initiative also reflects the shared commitment of both institutions to strengthen the entrepreneurial and innovation ecosystem in Asia.

ITB Establishes Collaboration and Memorandum of Understanding During the 50th Anniversary of ASEAN–Japan Relations

Institut Teknologi Bandung (ITB) has established a collaboration with the Economic Research Institute for ASEAN and East Asia (ERIA) in the fields of digital transformation and sustainable economic growth in the ASEAN and East Asia regions.

This collaboration was marked by the signing of a Memorandum of Understanding (MoU) between ERIA and ITB, along with several universities from ASEAN countries, held at Roppongi Academihills, Tokyo, Japan, on Saturday (16/12/2023).

ERIA is a research institute that focuses on areas such as trade and investment, energy security, climate change, environmental sustainability, digital economy, innovation, entrepreneurship, food security, and healthcare.

ITB Rector, Prof. Reini Wirahadikusumah, Ph.D., signed the MoU directly alongside representatives from Universiti Teknologi Malaysia, De La Salle University Philippines, ERIA, and other stakeholders, witnessed by Japan's Minister of Economy, Trade and Industry (METI), Mr. Ken Saito.

The collaboration comes in response to the significant digital transformation occurring in the ASEAN and East Asia regions, which has impacted economic growth. Therefore, enhancing digital ecosystem innovation is essential to drive progress and open up opportunities for entrepreneurship in the digital sector.

The MoU signing was part of the "ASEAN-Japan Co-Creation Forum," organized by ERIA in collaboration with Japan's Ministry of Economy, Trade and Industry (METI), the AEM-METI Economic and Industrial Cooperation Committee (AMEICC), and other related organizations. This event was also held in commemoration of the 50th Anniversary Summit of the ASEAN-Japan Partnership, aiming to further promote exchanges and strengthen ties between Japan and ASEAN member countries.

The event featured presentations on two key themes: "Dissemination of Digitalization in ASEAN and Japan" and the "ASEAN-Japan Circular Economy Initiative." Additionally, there were panel discussions on three topics: "Intergenerational ASEAN-Japan Collaboration to Address Global Challenges," "ASEAN-Japan Co-Creation for the Future," and "Energy Transition in Asia through Public-Private Partnerships."

On the previous day, Friday (15/12/2023), the Rector of ITB, accompanied by the Chairman of the Institute for Innovation and Entrepreneurship Development (LPIK ITB), Ir. R. Sugeng Joko Sarwono, M.T., Ph.D., visited The University of Tokyo. The visit was warmly received by the Executive Vice President of The University of Tokyo, Prof. Tatsuya Okubo, and Mr. Takeshi Kamijo, General Manager of the Institute for Open Innovation at The University of Tokyo. During the meeting held at the Yasuda Auditorium, both parties discussed innovation ecosystem development.

Outstanding Event

Budaya Ilmiah Unggul 2023

Scientific culture can generally be interpreted as either a scientific culture or a research culture. This is because scientific activities are closely related to research activities. The essential element in an excellent scientific culture is research, which is based on four fundamental aspects:

- Research is an essential characteristic of universities as knowledge institutions, which in turn determines the capacity, capability, and function of the university.
- Research serves as the "intellectual life blood" of all academic staff at the university, determining the advancement and updating of knowledge.
- Research guides teaching and learning at the university, becoming part of the movement towards the democratization of knowledge.

Research forms the foundation for invention and innovation, supporting the university's contribution to creating added value in society.

In the model of a research university or an entrepreneurial university, the interaction between lecturers and students is transformed into a new pattern that supports the strengthening of scientific culture in the pursuit of developing new knowledge and creating added value through invention and innovation.

It is hoped that some of the innovative research works managed by the Office of the Vice Rector for Research and Innovation (WRRI) can provide many benefits for the nation, the country, and our beloved ITB alma mater.

During the Gebyar Budaya Ilmiah Unggul event, a Workshop and Exhibition will be held with the theme "Towards an Excellent Scientific Culture: Current Research and Innovation Achievements and Future Strategies," which will take place on Wednesday, September 20, 2023, at the East Hall of ITB. The event will feature:

1. The first session, a talk show with speakers including the Head of LPPM, LPIK, and LPIT.
2. The second session, a Sharing Session on Excellent Scientific Culture with Young Lecturers, featuring young professors and PMDSU students, Young Researcher Innovators, and Young Community Service Researchers.
3. The third session, a workshop with speakers including the Director of Research and Development from UI, the Director of Research from UGM, and the Director of Research Facilitation from LPDP.
4. Awarding of the Young Lecturer with the Most Q1 Publications for 2020–2023.
5. An exhibition of research posters and featured innovation products

20 (twenty) posters on research, community service, and innovation, among them:

- 1 (one) poster from the Office of the Vice Rector for Research and Innovation, ITB.
- 1 (one) poster from the Institute for Research and Community Service, ITB.
- 1 (one) poster from the Institute for Innovation and Entrepreneurship Development, ITB.
- 1 (one) poster from the Institute for the Development of Science and Technology, ITB.
- 7 (seven) research posters from ITB researchers: Ir. Utjok W.R. Siagian, Ph.D., Prawira F. Belgiawan, Ph.D., Saut Aritua H. Sagala, Ph.D., Dr. Fikri Sul Fahmi, S.T., M.Sc., Sartika Indah Amalia Sudiarto, S.Si., M.Sc., Ph.D., Emenda Sembiring, S.T., M.T., M.Eng.Sc., Ph.D., Ir. Gatot Yudoko, M.A.SC., Ph.D., Dr. Ir. Sukoyo, M.T., Afriyanti Sumboja, Ph.D., Dr. Devi Nandita Choesin, M.Sc., Prof. Ir. Tjandra Setiadi, M.Eng., Ph.D., Prof. Suwarno.
- 7 (seven) Community Service posters from Prof. Dr. Elfahmi, S.Si., M.Si. on technology for cassava leaf utilization; Prof. Trio Adiono, S.T., M.T., Ph.D. on AI and IoT for monitoring water quality and fish appetite; Dr. rer. Nat. Widodo, S.T., M.T. on channeling hidden water in rock layers for dry villages in Grabagan; Dr. Ir. Aos, M.P. on hydroponic farming on Maratua Island; Helen Julian, S.T., M.T., Ph.D. on membrane technology for filtering and preserving functional beverages.
- 4 (four) Innovation posters: Modultrax by Bismo Jelantik Joyodiharjo, S.Sn., M.Ds.; Biofilter Water Treatment by Prof. Dr. Gede Suantika, S.Si., M.Si.; Bayupawa by Dr. Khoiruddin; and A low-cost efficient DC-DC Converter for DC-Microgrid Systems by Prof. Pekik Argo Dahono.
- 3 (five) Startup posters: Karla Bionics (prosthetic arm), Greenlabs (bio-based chemicals and polymers), Nasho (nano chemical coating and cleaner products).

PRIMA ITB 2023

PRIMA ITB is an exhibition of research, innovation, and community service results by ITB, showcased in the form of posters and products. As in previous years, the Office of the Vice Rector for Research and Innovation is organizing the exhibition of ITB's research, innovation, and community service results. Unlike previous years, PRIMA 2023 is being held in a hybrid format. Some of the posters showcasing ITB's research, innovation, and community service are displayed online through a virtual gallery, while others are exhibited in person at the West Hall and East Hall.

The PRIMA 2023 event series includes exhibitions and talk shows with the themes:

1. Creating Excellent ITB Community Service through Synergy and Collaboration;
2. Embracing the Future: Research Innovation for Industrial Sustainability.

At the 2023 exhibition, ITB is showcasing 700 works from 12 Faculties/Schools, 37 Research Centers/Research Centers/Science and Technology Centers of Excellence, 3 institutions, and Ditmawa across various research, innovation, and community service topics.

ITB encourages programs to strengthen its position and contribution, both in the scientific field and in its role within the community. These programs include Research, Innovation, and Community Service.

In the framework of achieving these goals, scientific research is a central and crucial component. A research culture must be a vital part of ITB's academic community life. The cultivation and strengthening of the research culture are initiatives that need to be continuously pursued to realize ITB's Excellent Scientific Culture.

One important aspect of an excellent scientific culture is the effort to widely disseminate knowledge. This broad dissemination of knowledge can achieve several goals at once, such as:

1. Increasing public understanding in science, technology, engineering, mathematics, and the arts;
2. Allowing the public to recognize various scientific works produced by ITB researchers;
3. Expanding collaboration opportunities between ITB and various elements of society in the framework of increasing the utilization of ITB's scientific works, and bridging the gap between knowledge supply and society's needs.

In terms of Research, nine (9) ITB lecturers are listed among the Top 2% of Scientists in the World: Single Year Impact 2023, released by Prof. John PA Ioannidis MD Ph.D. from Stanford University, Jeroen Baas from Elsevier, and Kevin Boyak from SciTech Strategies. Additionally, ITB's publications, especially in Top Tier Journals, have been steadily increasing each year. This is a source of pride for ITB to stand on par with top researchers on the international stage. This recognition strengthens ITB's vision to become a Globally Respected academic institution.

In terms of Innovation, ITB has achieved significant results, producing many research innovation programs and works that have been beneficial to society and industry. These innovations have been commercialized through the formation of startups, joint operations, joint ventures, and intellectual property licensing to industries.

According to Times Higher Education (THE) data in 2023, ITB is the university in Indonesia whose research is most widely used in the industry. ITB is also the first university in Indonesia to file an international patent through the PCT (Patent Cooperation Treaty). Currently, ITB has nurtured more than 245 startups. Some of these startups have paid royalties to ITB through the use of patent licenses. In 2023, ITB implemented the CoRE (Co-creation Research of Entrepreneurship) program in collaboration with PT. Pertamina (Persero) named Pertamina CoRE ITB. This program is a startup development activity from pre-incubation to incubation stages through problem-based learning. The Pertamina CoRE ITB program has received 306 students from 25 universities across Indonesia and has produced 40 startups in the energy sector and its derivatives.

From the Community Service perspective, ITB has increasingly reached the borders of Indonesia and the 3T areas (Lagging, Leading, and Outermost) in collaboration with the Ministry of Villages, Disadvantaged Regions, and Transmigration (PDTT) in the 3T Community Service activities in Eastern Indonesia, covering the outermost islands of Eastern Indonesia such as Morotai Island, Sula Islands, South Central Timor Island, North Central Timor Island, Alor Island, Sabu Raijua Island, Rote Ndau Island, and others.

ITB's LPPM has also developed the DESANESHA Application to connect Village Heads with ITB experts to apply science and technology and improve the Village Development Indicators (IDM). Community service activities are also documented through publicity in various national mass media, including the publication of a book titled "Excellent Scientific Culture for SDGs: Empowering Technology."

At this PRIMA Exhibition, these outstanding research works, innovative works, and community service works can be viewed in a hybrid format, and the talk shows on research, innovation, and community service can be attended in person.

During the event, ITB will also present 5 awards for Best Research Lecturer, Best Community Service Implementer, Best Collaboration Implementer, Best Innovator, and Best Center/PP, which have contributed to enhancing ITB's reputation.

Resource Directory of Research & Innovation

Faculty & School

Illustration from Adminssion ITB

FITB

Fakultas Ilmu dan Teknologi Kebumian

FACULTY OF EARTH SCIENCES AND TECHNOLOGY

FMIPA

Fakultas Matematika dan Ilmu Pengetahuan Alam

FACULTY OF MATHEMATHICS AND NATURAL SCIENCES

FSRD

Fakultas Seni Rupa dan Desain

FACULTY OF ARTS AND DESIGN

FTMD

Fakultas Teknik Mesin dan Dirgantara

FACULTY OF MECHANICAL AND AEROSPACE ENGINEERING

FTTM

Fakultas Teknik Pertambangan dan Perminyakan

FACULTY OF MINING AND PETROLEUM ENGINEERING

FTSL

Fakultas Teknik Sipil dan Lingkungan

FACULTY OF CIVIL AND ENVIRONMENTAL ENGINEERING

FTI

Fakultas Teknologi Industri

FACULTY OF INDUSTRIAL TECHNOLOGY

SBM

Sekolah Bisnis dan Manajemen

SCHOOL OF BUSINESS AND MANAGEMENT

SF

Sekolah Farmasi

SCHOOL OF PHARMACY

Faculty & School

Illustration from Adminssion ITB

SAPPK
Sekolah Arsitektur, Perencanaan, dan Pengembangan Kebijakan
SCHOOL OF ARCHITECTURE, PLANNING, AND POLICY DEVELOPMENT

SITH
Sekolah Ilmu dan Teknologi Hayati
SCHOOL OF LIFE SCIENCES AND TECHNOLOGY

STEI
Sekolah Teknik Elektro dan Informatika
SCHOOL OF ELECTRICAL ENGINEERING AND INFORMATICS

Research Group

1 Kelompok Keahlian Geologi Terapan
APPLIED GEOLOGY RESEARCH GROUP

2 Kelompok Keahlian Petrologi, Volkanologi dan Geokimia
PETROLOGY, VOLCANOLOGY, AND GEOCHEMISTRY RESEARCH GROUP

3 Kelompok Keahlian Sains Atmosfer
ATMOSPHERIC SCIENCE RESEARCH GROUP

4 Kelompok Keahlian Oseanografi
OCEANOGRAPHY RESEARCH GROUP

5 Kelompok Keahlian Geodesi
GEODESY RESEARCH GROUP

6 Kelompok Keahlian Inderaja dan Sains Informasi Geografis
REMOTE SENSING & GEOGRAPHIC INFORMATION SCIENCE RESEARCH GROUP

7 Kelompok Keahlian Hidrografi
HYDROGRAPHY RESEARCH GROUP

8 Kelompok Keahlian Surveying dan Kadaster
SURVEYING AND CADASTRE RESEARCH GROUP

9 Kelompok Keahlian Geodinamik dan Sedimentologi
GEODYNAMICS AND SEDIMENTOLOGY RESEARCH GROUP

10 Kelompok Keahlian Paleontologi dan Geologi Kuarter
PALEONTOLOGY AND QUATERNARY GEOLOGY RESEARCH GROUP

11 Kelompok Keahlian Astronomi
ATMOSPHERIC SCIENCE RESEARCH GROUP

12 Kelompok Keahlian Fisika Bumi dan Sistem Kompleks
EARTH PHYSICS AND COMPLEX SYSTEM RESEARCH GROUP

13 Kelompok Keahlian Fisika Material Elektronik
PHYSICS OF ELECTRONIC MATERIALS RESEARCH GROUP

14 Kelompok Keahlian Fisika Magnetik dan Fotonik
PHYSICS OF MAGNETISM AND PHOTONIC RESEARCH GROUP

15 Kelompok Keahlian Fisika Nuklir dan Biofisika
NUCLEAR PHYSICS AND BIOPHYSICS RESEARCH GROUP

16 Kelompok Keahlian Fisika Teori Energi Tinggi dan Instrumentasi
THEORETICAL HIGH ENERGY PHYSICS & INSTRUMENTATION RESEARCH GROUP

17 Kelompok Keahlian Biokimia
BIOCHEMISTRY RESEARCH GROUP

18 Kelompok Keahlian Kimia Analitik
ANALYTICAL CHEMISTRY RESEARCH GROUP

19 Kelompok Keahlian Kimia Anorganic dan Fisik
INORGANIC AND PHYSICAL CHEMISTRY RESEARCH GROUP

20 Kelompok Keahlian Kimia Organik
ORGANIC CHEMISTRY RESEARCH GROUP

21 Kelompok Keahlian Aljabar
ALGEBRA RESEARCH GROUP

22 Kelompok Keahlian Analisis dan Geometri
ANALYSIS AND GEOMETRY RESEARCH GROUP

23 Kelompok Keahlian Matematika Kombinatorika
COMBINATORIAL MATHEMATICS RESEARCH GROUP

24 Kelompok Keahlian Matematika Industrial dan Keuangan
INDUSTRIAL AND FINANCIAL MATHEMATICS RESEARCH GROUP

25 Kelompok Keahlian Statistik
STATISTICS RESEARCH GROUP

26 Kelompok Keahlian Seni Rupa
VISUAL ART RESEARCH GROUP

27 Kelompok Keahlian Estetika dan Ilmu-Ilmu Seni
AESTHETICS AND ARTS RESEARCH GROUP

28 Kelompok Keahlian Manusia dan Ruang
HUMAN AND INTERIOR SPACE RESEARCH GROUP

29 Interior Kelompok Keahlian Komunikasi Visual dan Multimedia
VISUAL COMMUNICATION AND MULTIMEDIA RESEARCH GROUP

30 Kelompok Keahlian Manusia dan Desain Produk Industri
HUMAN AND INDUSTRIAL PRODUCT DESIGN RESEARCH GROUP

31 Kelompok Keahlian Kria dan Tradisi
CRAFT AND TRADITION RESEARCH GROUP

32 Kelompok Keahlian Desain dan Budaya Visual
DESIGN AND VISUAL CULTURE RESEARCH GROUP

33 Kelompok Keahlian Ilmu-Ilmu Kemanusiaan
HUMANITIES RESEARCH GROUP

34 Kelompok Keahlian Literasi Media dan Budaya
LITERACY, MEDIA AND CULTURE RESEARCH GROUP

35 Kelompok Keahlian Perancangan Mesin
MECHANICAL DESIGN RESEARCH GROUP

36 Kelompok Keahlian Konversi Energi
ENERGY CONVERSION RESEARCH GROUP

37 Kelompok Keahlian Ilmu dan Teknik Material
MATERIALS SCIENCE AND ENGINEERING RESEARCH GROUP

38 Kelompok Keahlian Teknik Produksi Mesin
MECHANICAL PRODUCTION ENGINEERING RESEARCH GROUP

39 Kelompok Keahlian Fisika Terbang
FLIGHT PHYSICS RESEARCH GROUP

40 Kelompok Keahlian Struktur Ringan
LIGHTWEIGHT STRUCTURE RESEARCH GROUP

41 Kelompok Keahlian Desain, Operasi, dan Perawatan Pesawat Terbang
AIRCRAFT DESIGN, OPERATION, AND MAINTENANCE RESEARCH GROUP

42 Kelompok Keahlian Geofisika Global
GLOBAL GEOPHYSICS RESEARCH GROUP

43 Kelompok Keahlian Teknik Pemboran, Produksi, dan Manajemen Migas
DRILLING ENGINEERING, PRODUCTION, & OIL AND GAS MANAGEMENT RESEARCH GROUP

44 Kelompok Keahlian Teknik Reservoir
RESERVOIR ENGINEERING RESEARCH GROUP

45 Kelompok Keahlian Eksplorasi Sumberdaya Bumi
EARTH RESOURCES EXPLORATION RESEARCH GROUP

46 Kelompok Keahlian Teknik Metalurgi
METALLURGY ENGINEERING RESEARCH GROUP

47 Kelompok Keahlian Teknik Pertambangan
MINING ENGINEERING RESEARCH GROUP

48 Kelompok Keahlian Geofisika Terapan dan Eksplorasi
APPLIED GEOPHYSICS AND EXPLORATION RESEARCH GROUP

49 Kelompok Keahlian Seismologi Eksplorasi dan Rekayasa
SEISMOLOGY EXPLORATION AND ENGINEERING RESEARCH GROUP

50 Kelompok Keahlian Rekayasa Struktur
STRUCTURAL ENGINEERING RESEARCH GROUP

51 Kelompok Keahlian Rekayasa Geoteknik
GEOTECHNICAL ENGINEERING RESEARCH GROUP

52 Kelompok Keahlian Teknik Sumber Daya Air
WATER RESOURCES ENGINEERING RESEARCH GROUP

53 Kelompok Keahlian Rekayasa Transportasi
TRANSPORTATION ENGINEERING RESEARCH GROUP

54 Kelompok Keahlian Manajemen dan Rekayasa Konstruksi
CONSTRUCTION ENGINEERING AND MANAGEMENT RESEARCH GROUP

55 Kelompok Keahlian Rekayasa Air dan Limbah Cair
WATER AND WASTEWATER ENGINEERING RESEARCH GROUP

56 Kelompok Keahlian Pengelolaan Udara dan Limbah
AIR AND WASTE MANAGEMENT RESEARCH GROUP

57 Kelompok Keahlian Teknologi Pengelolaan Lingkungan
ENVIRONMENTAL MANAGEMENT TECHNOLOGY RESEARCH GROUP

58 Kelompok Keahlian Teknik Lepas Pantai
OFFSHORE ENGINEERING RESEARCH GROUP

59 Kelompok Keahlian Teknik Pantai
COASTAL ENGINEERING RESEARCH GROUP

60 Kelompok Keahlian Perancangan dan Pengembangan Proses Teknik Kimia
CHEMICAL ENGINEERING PROCESS DESIGN AND DEVELOPMENT RESEARCH GROUP

61 Kelompok Keahlian Perancangan dan Pengembangan Produk Teknik Kimia
CHEMICAL ENGINEERING PRODUCT DESIGN AND DEVELOPMENT RESEARCH GROUP

62 Kelompok Keahlian Energi dan Sistem Pemroses Teknik Kimia
ENERGY AND CHEMICAL ENGINEERING PROCESSING SYSTEM RESEARCH GROUP

63 Kelompok Keahlian Teknologi Reaksi Kimia dan Katalis
CHEMICAL REACTION TECHNOLOGY AND CATALYSTS RESEARCH GROUP

64 Kelompok Keahlian Teknologi Pengolahan Biomassa dan Pangan
BIOMASS AND FOOD PROCESSING TECHNOLOGY RESEARCH GROUP

65 Kelompok Keahlian Teknik Fisika
ENGINEERING PHYSICS RESEARCH GROUP

66 Kelompok Keahlian Instrumentasi dan Kontrol
INSTRUMENTATION AND CONTROL RESEARCH GROUP

67 Kelompok Keahlian Fisika Bangunan
BUILDING PHYSICS RESEARCH GROUP

68 Kelompok Keahlian Material Fungsional Maju
ADVANCED FUNCTIONAL MATERIALS RESEARCH GROUP

69 Kelompok Keahlian Sistem Manufaktur
MANUFACTURING SYSTEM RESEARCH GROUP

70 Kelompok Keahlian Manajemen Industri
INDUSTRIAL MANAGEMENT RESEARCH GROUP

71 Kelompok Keahlian Sistem Industri dan Tekno-Ekonomi
INDUSTRIAL SYSTEM AND TECHNO-ECONOMICS RESEARCH GROUP

72 Kelompok Keahlian Ergonomi, Rekayasa Kerja, dan Keselamatan Kerja
ERGONOMICS, WORK ENGINEERING, AND WORK SAFETY RESEARCH GROUP

73 Kelompok Keahlian Sistem Informasi dan Keputusan
INFORMATION SYSTEM AND DECISION SCIENCE RESEARCH GROUP

74 Kelompok Keahlian Sistem Infrastruktur Wilayah dan Kota
REGIONAL AND URBAN PLANNING RESEARCH GROUP

75 Kelompok Keahlian Perencanaan dan Perancangan Kota
URBAN PLANNING AND DESIGN RESEARCH GROUP

76 Kelompok Keahlian Pengelolaan Pembangunan dan Pengembangan Kebijakan
POLICY PLANNING AND DEVELOPMENT MANAGEMENT RESEARCH GROUP

77 Kelompok Keahlian Perencanaan Wilayah dan Perdesaan
REGIONAL AND RURAL PLANNING RESEARCH GROUP

78 Kelompok Keahlian Perancangan Arsitektur
ARCHITECTURAL DESIGN RESEARCH GROUP

79 Kelompok Keahlian Perumahan dan Permukiman
HOUSING AND SETTLEMENT RESEARCH GROUP

80 Kelompok Keahlian Teknologi Bangunan
BUILDING TECHNOLOGY RESEARCH GROUP

81 Kelompok Keahlian Sejarah, Teori, dan Kritik Arsitektur
ARCHITECTURAL HISTORY, THEORY, AND CRITICISM RESEARCH GROUP

82 Kelompok Keahlian Sistem dan Pemodelan Ekonomi
ECONOMICS SYSTEM AND MODELLING RESEARCH GROUP

83 Kelompok Keahlian Kewirausahaan dan Manajemen Teknologi
ENTREPRENEURSHIP AND TECHNOLOGY MANAGEMENT RESEARCH

84 Kelompok Keahlian Strategi Bisnis dan Pemasaran
BUSINESS STRATEGY AND MARKETING RESEARCH GROUP

85 Kelompok Keahlian Risiko Bisnis dan Keuangan
BUSINESS RISK AND FINANCE RESEARCH GROUP

86 Kelompok Keahlian Pengambilan Keputusan dan Negosiasi Strategi
DECISION MAKING AND STRATEGIC NEGOTIATION RESEARCH GROUP

87 Kelompok Keahlian Manajemen Operasi dan Kinerja
OPERATION AND PERFORMANCE MANAGEMENT RESEARCH GROUP

88 Kelompok Keahlian Manajemen Manusia dan Pengetahuan
PEOPLE AND KNOWLEDGE MANAGEMENT RESEARCH GROUP

89 Kelompok Keahlian Agroteknologi dan Teknologi Bioproduk
AGROTECHNOLOGY AND BIOPRODUCT TECHNOLOGY RESEARCH

90 Kelompok Keahlian Genetika dan Bioteknologi Molekuler
GENETICS AND MOLECULAR BIOTECHNOLOGY RESEARCH GROUP

91 Kelompok Keahlian Sains dan Bioteknologi Tumbuhan
PLANT SCIENCE AND BIOTECHNOLOGY RESEARCH GROUP

92 Kelompok Keahlian Ekologi
ECOLOGY RESEARCH GROUP

93 Kelompok Keahlian Bioteknologi Mikroba
MICROBIAL BIOTECHNOLOGY RESEARCH GROUP

94 Kelompok Keahlian Fisiologi Perkembangan Hewan dan Sains Biomedik
PHYSIOLOGY OF ANIMAL DEVELOPMENT AND BIOMEDICAL SCIENCE RESEARCH GROUP

95 Kelompok Keahlian Manajemen Sumber Daya Hayati
WATER MANAGEMENT OF BIORESOURCES RESEARCH GROUP AND WASTEWATER ENGINEERING RESEARCH GROUP

96 Kelompok Keahlian Teknologi Kehutanan
FORESTRY TECHNOLOGY RESEARCH GROUP

97 Kelompok Keahlian Farmakokimia
PHARMACOCHEMISTRY RESEARCH GROUP

98 Kelompok Keahlian Farmasetika
PHARMACEUTICS INDUSTRY RESEARCH GROUP

99 Kelompok Keahlian Biologi Farmasi
PHARMACEUTICAL BIOLOGY RESEARCH GROUP

100 Kelompok Keahlian Farmakologi dan Farmasi Klinik
PHARMACOLOGY AND CLINICAL PHARMACY RESEARCH GROUP

101 Kelompok Keahlian Ilmu Keolahragaan
SPORTS SCIENCE RESEARCH GROUP

102 Kelompok Keahlian Ketenagalistrikan
ELECTRIC POWER RESEARCH GROUP

103 Kelompok Keahlian Teknik Telekomunikasi
TELECOMMUNICATION ENGINEERING RESEARCH GROUP

104 Kelompok Keahlian Elektronika
ELECTRONICS RESEARCH GROUP

105 Kelompok Keahlian Sistem Kendali dan Komputer
CONTROL SYSTEM AND COMPUTER RESEARCH GROUP

106 Kelompok Keahlian Teknik Komputer
COMPUTER ENGINEERING RESEARCH GROUP

107 Kelompok Keahlian Teknik Biomedika
BIOMEDICAL ENGINEERING RESEARCH GROUP

108 Kelompok Keahlian Teknologi Informasi
INFORMATION TECHNOLOGY RESEARCH GROUP

109 Kelompok Keahlian Rekayasa Perangkat Lunak dan Pengetahuan
SOFTWARE AND KNOWLEDGE ENGINEERING RESEARCH GROUP

110 Kelompok Keahlian Informatika
INFORMATICS RESEARCH GROUP

National Center of Excellence in Science & Technology

1 Pusat Unggulan Iptek Broadband Wireless Access
CENTER OF EXCELLENCE IN BROADBAND WIRELESS ACCESS

2 Pusat Unggulan Iptek Nanosains dan Nanoteknologi
CENTER OF EXCELLENCE IN NANOSCIENCE AND NANOTECHNOLOGY

3 Pusat Unggulan Iptek Teknologi Pertahanan dan Keamanan
CENTER OF EXCELLENCE IN DEFENSE AND SECURITY TECHNOLOGY

4 Pusat Unggulan Iptek Teknologi Transportasi Berkelanjutan
CENTER OF EXCELLENCE IN SUSTAINABLE TRANSPORTATION

5 Pusat Unggulan Iptek Riset Terpadu Sains dan Teknologi Kegempaan
CENTER OF EXCELLENCE IN EARTHQUAKE SCIENCE AND TECHNOLOGY

6 Pusat Unggulan Iptek Nutrasetikal
CENTER OF EXCELLENCE IN NUTRACEUTICAL

7 Pusat Unggulan Iptek Inovasi Kota & Komunitas Cerdas
CENTER OF EXCELLENCE IN SMART CITY AND COMMUNITY INNOVATION

8 Pusat Unggulan Iptek Intelegensia Buatan
CENTER OF EXCELLENCE IN ARTIFICIAL INTELLIGENCE

9 Pusat Unggulan Iptek Carbon Capture Storage dan Carbon Capture, Utility and Storage
CENTER OF EXCELLENCE IN CARBON CAPTURE STORAGE AND CARBON CAPTURE, UTILITY AND STORAGE

Research Center

1 Pusat Penelitian Biosains dan Bioteknologi
RESEARCH CENTER FOR BIOSCIENCE AND BIOTECHNOLOGY

2 Pusat Penelitian Energi Baru dan Terbarukan
RESEARCH CENTER FOR NEW AND RENEWABLE ENERGY

3 Pusat Penelitian Infrastruktur dan Kewilayahan
RESEARCH CENTER FOR INSFRASTRUCTURES AND REGIONS

4 Pusat Penelitian Mitigasi Bencana
RESEARCH CENTER FOR DISASTER MITIGATION

5 Pusat Penelitian Nanosains dan Nanoteknologi
RESEARCH CENTER FOR NANOSCIENCE AND NANOTECHNOLOGY

6 Pusat Penelitian Produk Budaya dan Lingkungan
RESEARCH CENTER FOR CULTURAL AND ENVIRONMENTAL PRODUCTS

7 Pusat Penelitian Teknologi Informasi dan Komunikasi
RESEARCH CENTER FOR INFORMATION AND COMMUNICATION

Center

1 Pusat Kecerdasan Buatan
CENTER FOR ARTIFICIAL INTELLIGENCE

2 Pusat Infrastruktur Data Spasial
CENTER FOR SPATIAL DATA INFRASTRUCTURE

3 Pusat Inovasi dan Komunitas Cerdas
CENTER FOR SMART CITY AND COMMUNITY INNOVATION

4 Pusat Kajian Halal
CENTER FOR HALAL STUDIES

5 Pusat Kebijakan Keenergian
CENTER FOR RESEARCH ON ENERGY POLICY

6 Pusat Kebijakan Publik dan Kepemerintahan
CENTER FOR PUBLIC POLICY AND GOVERNANCE

7 Pusat Mikroelektronika
CENTER FOR MICROELECTRONICS

8 Pusat Pemberdayaan Perdesaan
CENTER FOR RURAL EMPOWERMENT

9 Pusat Pemodelan Matematika dan Simulasi
CENTER FOR MATHEMATICAL MODELLING AND SIMULATION

10 Pusat Pengembangan Sumber Daya Air
CENTER FOR WATER RESOURCES DEVELOPMENT

11 Pusat Pengembangan Teknologi Transportasi Berkelanjutan
CENTER FOR SUSTAINABLE TRANSPORTATION TECHNOLOGY DEVELOPMENT

12 Pusat Pengembangan Wilayah Pesisir dan Laut
CENTER FOR COASTAL AND MARINE DEVELOPMENT

13 Pusat Penginderaan Jauh
CENTER FOR REMOTE SENSING

14 Pusat Pengkajian Logistik dan Sistem Rantai Pasok
CENTER FOR LOGISTICS AND SUPPLY CHAIN STUDIES

15 Pusat Perencanaan dan Pengembangan Kepariwisataan
CENTER FOR TOURISM PLANNING AND DEVELOPMENT

16 Pusat Teknologi Pertahanan dan Keamanan
CENTER FOR DEFENSE AND SECURITY TECHNOLOGY

17 Pusat Perubahan Iklim
CENTER FOR CLIMATE CHANGE

18 Pusat Rekayasa Industri
CENTER FOR INDUSTRIAL ENGINEERING

19 Pusat Studi Agraria
CENTER FOR AGRARIAN STUDIES

20 Pusat Studi Lingkungan Hidup
CENTER FOR ENVIRONMENTAL STUDIES

21 Pusat Studi Sistem Tak Berawak
CENTER FOR UNMANNED SYSTEM STUDIES

22 Pusat Teknologi Instrumentasi dan Otomasi
CENTER FOR INSTRUMENTATION TECHNOLOGY AND AUTOMATION

23 Pusat Teknologi Kesehatan dan Keolahragaan
CENTER FOR HEALTH AND SPORT TECHNOLOGIES

24 Pusat Rekayasa Katalisis
CENTER FOR CATALYSIS ENGINEERING

25 Pemanfaatan Karbon Dioksida dan Gas Suar
CENTER FOR CARBON DIOXIDE AND FLARE GAS

WRRI ITB

Office for Vice Rector for
Research and Innovation
wrri.itb.ac.id

LPPM ITB

Institute for Research and
Community Services
lppm.itb.ac.id

LPIK ITB

Institute of Innovation and
Entrepreneurship Development
lpik.itb.ac.id

LPIT ITB

Institute for Science and
Technology Development
lpit.itb.ac.id

CRCS Building, fl. 7, Jl. Ganesha 10, Bandung, 40132
phone: 022-86010082 | fax: 022-86010051 |email: wrri@itb.ac.id