



اونیورسیتی تیکنولوژی برونی  
UNIVERSITI TEKNOLOGI BRUNEI

# UTB RESEARCH e-BULLETIN

## CONTENTS:

- ❖ RESEARCH ACTIVITIES
- ❖ FEATURED RESEARCH EVENT
- ❖ NEW RESEARCH PROJECTS

## EDITORIAL TEAM:

GRADUATE STUDIES AND RESEARCH OFFICE



2023

# Research Activities

## Centre for Transport Research (CfTR)

### i. RADED Utilisation

CfTR conducted a series of training sessions for police officers, along with "Train the Trainer" workshops for future Road Accident Data Enhancement and Development (RADED) trainers. These sessions were designed to address the ongoing training needs of police officers due to frequent personnel changes. Approximately 185 police personnel and 7 trainers participated in the sessions, which were held from September 18 to September 27 during the semester break. These training sessions were part of the requirements set by Majlis Kebangsaan Keselamatan Jalan Raya (MKKJR) to ensure effective RADED utilisation. The grant for the training sessions was provided by MKKJR. Dr. Wida Susanty Haji Suhaili served as the lead trainer for the project. The training sessions were supported by Yazid and Razatul, who served as technicians from the Civil Engineering (CE) programme area. The sessions revealed several additional requirements to ensure full utilisation of the RADED system. As a result, the system will undergo modifications to meet the newly identified targets.



RADED Utilisation Training Workshops.

## ii. Consultancy with ALMEC Corporation (ASEAN-Japan Road Traffic Safety Study)

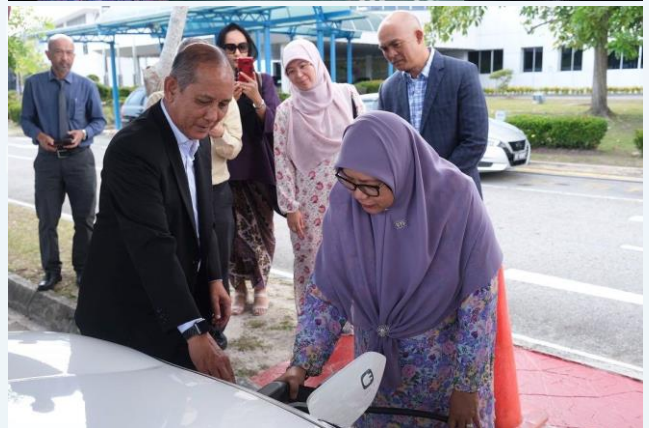
Three researchers from CfTR have been engaged in consultancy work with ALMEC Corporation for the ASEAN-Japan Road Traffic Safety Study Project. Approval to undertake this consultancy work was given by the Vice-Chancellor for the period from 22 November 2022 to 14 February 2023. The grant amount for this consultancy work was BND 9,256.10. The Principal Investigator for this project was Dr. Tan Soon Jiann. The team members involved in the project were Dr. Yap Yok Hoe and Dr. Wida Susanty Haji Suhaili. The study produced a joint report on the current situation of road traffic safety in Brunei Darussalam. The findings from this report were shared in preparation for an upcoming ASEAN-level meeting. The study presented three key Information and Communication Technologies (ICT) measures that have been implemented in Brunei to enhance road safety. The first measure is the National Road Accident Database System, which was developed through the RADED project. The second measure is a pilot project aimed at replacing Speed Warning Devices (SWDs). The third measure is the implementation of safety features on the Sultan Haji Omar 'Ali Saifuddien (SOAS) Bridge, supported by ICT and Artificial Intelligence (AI) technologies.



CfTR research team with ALMEC Corporation representatives for the ASEAN-Japan Road Traffic Safety Study Project.

### iii. Solar Powered On-Grid Electric Vehicle Charging Station with MoA Signing

This project focuses on the deployment and analysis of a solar Photovoltaic (PV)-based charging system for Electric Vehicles (EVs), integrated with the grid to ensure stable operation. The project is being implemented under the Universiti Teknologi Brunei (UTB) Special Research Grant for 2022-2023. The grant amount for this project is BND 35,080. The Principal Investigator for this project is Dr. Sheik Mohammed Sulthan. The team members involved in the project are Dr. Tan Soon Jiang, Dr. Ang Swee Peng, and Dr. Azlan Ahmad. This pilot project is expected to study the travel patterns and parking behavior at office spaces, analyze and validate the power generation from the solar PV system and its utilization for EV charging, and examine the charging and discharging characteristics of an early EV model (Mitsubishi MiEV) and a recent EV model (Kia Niro SUV) under various driving conditions. The project is currently under study, with expected outcomes including the optimal prototype design of a solar-powered EV charging station suitable for implementation in Brunei Darussalam, as well as the development of commercial solutions for sustainable EV charging for private and government agencies. Additionally, a Memorandum of Agreement (MoA) has been signed between CfTR and Grand Motors Sdn. Bhd at UTB. This MoA signifies a research collaboration aimed at developing an EV Charging Station.



Signing of the Memorandum of Agreement (MoA) between CfTR and Grand Motors Sdn. Bhd. and demonstration of the solar-powered EV charging system.

#### iv. MoU Signing with Mitsubishi Corporation

The Memorandum of Understanding (MoU) entails the donation of an EV by Mitsubishi Corporation to UTB. This donation will serve as a significant asset for the university, enabling students and academic staff to engage in EV-related learning, research, and innovation. The Mitsubishi Electric Vehicle (MiEV) will be used for academic and research purposes.



Signing of the MoU between UTB and Mitsubishi Corporation and demonstration of the solar-powered EV charging system.

# Research Activities

## Centre for Innovative Engineering (CIE)

### i. InvENT 2023

CIE in collaboration with the Asia Technological University Network (ATU-Net) and Universiti Teknologi MARA (UiTM), successfully hosted the International Conference on Innovation and Entrepreneurship in Computing, Engineering, and Science Education 2023 (invENT 2023) on October 23-24, 2023, at the International Convention Centre, Brunei Darussalam. The conference, themed "Adoption of Digital Transformation: Social Resilience towards Sustainable Development," brought together innovators, entrepreneurs, and industry experts to discuss how digital transformation drives innovation, reshapes industries, and addresses long-term development challenges.

The event provided a platform for researchers, academics, and practitioners to share insights on the latest advancements in innovation, entrepreneurship, information technology, and their applications. Accepted papers were published by the Association for Computing Machinery (ACM) and/or Francis and Taylor Publishers, supporting ongoing research in innovative technology.



Photos from the conference, including the signing of the research collaboration certificate and the campus visit.

# Research Activities

## Centre for research on Agri-Food Science and Technology (CrAFT)

### i. Smart Greenhouse Project

Researchers from CrAFT, together with staff from the Department of Agriculture and Agrifood (DoA) under the Ministry of Primary Resources and Tourism, visited several farms in the Tungku, Masin, and Limpaki areas, including a chilli farm owned by HARQ Enterprise, to explore potential projects. The visit addressed several issues raised by the farmers.

To tackle these challenges, stakeholders proposed the Smart Greenhouse Project, aimed at integrating technology and sustainable practices to optimize chilli plant growth and resource management. This project consists of three sub-projects led by Yang Mulia Dr. Lim Tiong Hoo and Yang Mulia Haji Ismit bin Haji Mohamad, with the participation of final-year and third-year students from the Electrical and Electronic Engineering Programme at the Faculty of Engineering. The student researchers are responsible for developing the systems and prototypes for the project. The signing of MoU for this collaboration is expected to take place in November 2023 at UTB.



Initial site visit and project meeting, and an overview of the Smart Greenhouse Project.

## ii. Capacity Building for Solar Design and Installation for Agriculture

A solar-powered farm utilizes solar energy as its primary power source. It employs solar panels or PV systems to capture and convert sunlight into electricity. This renewable energy source offers several benefits for farms, including lower operating costs, enhanced environmental sustainability, and increased energy independence. Solar energy is clean and renewable, emitting minimal greenhouse gases. Farms using solar power can significantly reduce their carbon footprint, help mitigate climate change, and promote sustainable agricultural practices. However, a significant challenge identified by stakeholders is the lack of technical expertise required to implement and utilize solar energy effectively.

To address this issue, CrAFT will organize a human capacity-building program to support the adoption of solar-powered technology in agriculture. With the technical expertise of CrAFT members and funding from a Special Research Grant provided by UTB, a series of hands-on workshops will be conducted. These workshops aim to impart the knowledge and skills necessary for designing, installing, and maintaining solar panels and related equipment for farmers, thereby fostering a more environmentally friendly agricultural industry.



Students involvement in assessing solar performance .



# Featured Research Events

## Borneo International Conference on Agrotechnology (BICAT) 2022

Universiti Teknologi Brunei (UTB) is proud to present the inaugural UTB-Science, Technology, and Engineering Connect (UTB-STE Connect) 2023, held in honor of His Royal Highness Prince (Dr.) Haji Al-Muhtadee Billah, the Crown Prince and Pro-Chancellor of UTB, who was conferred the Honorary Doctorate in Technology Innovation. The event, taking place from 23-25 October 2023 at the International Convention Centre (ICC) and Rizqun



International Hotel, is organized in collaboration with Universiti Brunei Darussalam (UBD), Universiti Teknologi Petronas (UTP), and Universiti Malaysia Perlis (UniMAP).

UTB-STE Connect 2023 featured several key conferences and feature events. The conferences included BICET 2023, focusing on "Engineering and Technologies for a Cleaner and Greener World"; ACIIS 2023, exploring "Intelligent and Resilient Digital Innovations for Sustainable Living"; ICBMIS 2023, discussing "Business Innovation for Sustainable Development Goals"; ICABF 2023, examining "Technology for Future Agriculture, Beverage, and Food Manufacturing"; and InvENT 2023, centered on "Adoption of Digital Transformation for Sustainable Development."

Additionally, the event featured the 11th ATU-Net Board Meeting, a platform for reviewing and setting future goals for ATU-Net members; the 2nd UTB University Presidents' Forum, which focused on "Rethinking Education Amidst Global Uncertainties"; and the 1st UTB Women Leadership Forum, aimed at empowering women in STEM through discussions on leadership and work-life balance.

The opening day featured the Women Leadership Forum and concurrent conferences, with His Royal Highness launching the event. Other highlights include the 2<sup>nd</sup> UTB University Presidents' Forum, discussions on business resilience and sustainable development, and the Women Leadership Workshop addressing global challenges.

UTB-STE Connect 2023 is a global platform for intellectual discourse, networking, and collaboration, offering participants an opportunity to propose innovative solutions for the betterment of the world.

For more details about the conferences and events, please visit:

<https://www.utb.edu.bn/news?tag=UTB-STE%20Connect%202023>

# New Research Projects

## Internal Grant Projects 2023/2024

In its continuous pursuit of research recognition, UTB has been augmenting its academic staff with high research potential. The university offers Internal Research Grants annually to encourage and foster research among all academic staff. Priority is granted to multidisciplinary and transdisciplinary research projects that align with the current national vision.

The following are 21 research projects that were awarded the internal grant:

No.	Title	Principal Investigator	Research Thrust
1	Explainable Artificial Intelligence In Information Systems Audit	Assoc. Prof. Dr. Mohamed Ismail Seyed Mohamed Buhari	Society and Enterprise
2	Mechanistic Understandings of Cadmium Removal from Water Released from Paddy Fields in Brunei Darussalam Using Magnetic Multi-walled Carbon Nanotube (MW-CNT)	Assoc. Prof. Dr. Mubarak Mujawar	Sustainable Build Environment
3	Correlation between the Solar Heat Transfer and Physicochemical/Thermal Properties of Carbon-Based Nanofluids (CBNFs) under Different Hydrodynamic Conditions	Assoc. Prof. Dr. Reddy Prasad	Energy
4	Developing a Multi-Embedded Internet of Things (IoT) Open-Source System Trainer for Technical Psychomotor Teaching and Learning Enhancements	Ir. Dr. Ahmad Azlan bin Ab Aziz	CIE
5	Machine learning approach in corrosion monitoring/detection/prediction on high-value Aluminium structure	Dr. Au Thien Wan	Digital & Creativity
6	Digital Wellbeing: Issues and Challenges Towards Digital Society	Dr. Fahmi Ibrahim	Society and Enterprise
7	Audit Effectiveness, Regulation and Auditor: The study of Industries in Audit Reporting while Performing Internal and External Audit	Dr. Junaid M.Shaikh	Society and Enterprise
8	A Novel 13-level Single Source Transformerless Multilevel Boost Inverter for Solar Photovoltaic Applications	Dr. Law Kah Haw	CIE
9	The Development of Value-Added Food Products from Roselle Fruit (Hibiscus Sabdariffa L.)	Dr. Masmunira Hj Rambli	CrAFT

## Internal Grant Projects 2023/2024

No.	Title	Principal Investigator	Research Thrust
10	Energy Efficient and Deadline Aware Dynamic Trust-Based Task Allocation in Cloud, Edge and Fog Computing to Support Trustworthy Computation in 5G and Beyond	Dr. S. H. Shah Newaz	Digital & Creativity
11	Characterisation of functional properties and prebiotic potential from durian ( <i>Durio zibethinus</i> Murr.) seed	Dr. Syazana Abdullah Lim	CrAFT
12	Enhancing Energy-efficiency of Next Generation Passive Optical Networks	Haji Rudy Erwan Haji Ramlie	Digital & Creativity
13	Study on Oxidation Stability Behaviour on Natural Ester Oil Mixed with Antioxidants for Power Transformer Applications	Ir. Dr. Nor Asiah Muhamad	Energy
14	Machine Learning Based Performance, Forecasting, Drowsiness Estimation, and Fatigue Diagnosing for Driving Safety	Prof. Dr Adel Al-Jumaily	CfTR
15	Constructed Wetlands - An Innovative Sustainable Approach to Treating Poultry Wastewater in Brunei	Prof. Dr. Sivakumar Manickam	Energy
16	Anaerobic Digestion of Brunei Food Waste Seeding with CO <sub>2</sub> Microbubbles	Ummul Hasanah Haji Hassan	Energy
17	Development of Hardstocks from Rice Bran Oil for Margarine Production	Dr. Phuah Eng Tong	CrAFT
18	Developing an Energy Audit and Safety Condition Monitoring System to Promote Sustainability in Brunei Darussalam	Dr. Ang Swee Peng	Energy
19	Design and Usability Evaluation of Game-based Physical Rehabilitation in Brunei Darussalam	Dr. Ahmad M. S. Elaklouk	CrAFT
20	Sustainability Evaluation of Circular Economy Integrated Pesticide Application Technologies Using Extended Pinch Analysis Approach	Dr. Wendy Ng Pei Qin	Energy
21	Water Retention Analysis for Smart Irrigation Systems	Haji Ismit bin Haji Mohamad	CrAFT