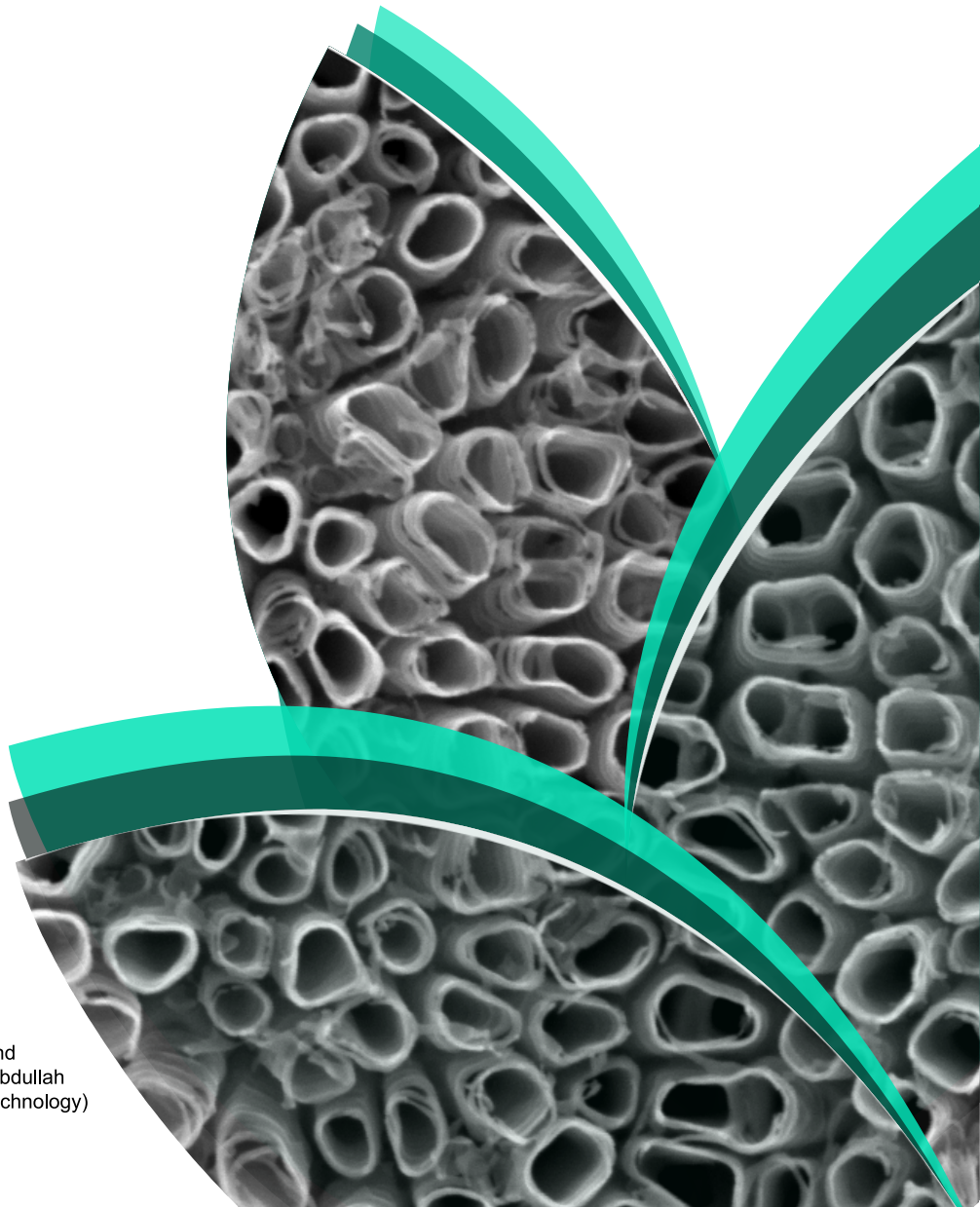


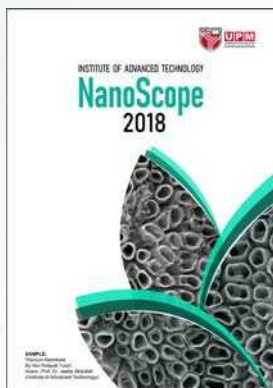
INSTITUTE OF ADVANCED TECHNOLOGY

# NanoScope 2018



**SAMPLE:**

Titanium Nanotubes  
By Nor Hidayat Yusof, and  
Assoc. Prof. Dr. Jaafar Abdullah  
(Institute of Advanced Technology)



## COVER

Image obtained using Field Emission Scanning Electron Microscope (FESEM)

## SAMPLE:

Titanium Nanotubes  
By Nor Hidayat Yusof, and  
Assoc. Prof. Dr. Jaafar Abdullah  
(Institute of Advanced Technology)

## COMMITTEE

### Advisor:

Assoc. Prof. Dr. Suraya Abdul Rashid

### Arrangement and Design:

Nursyahirah Amirah Mazlan

### Contributors:

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Roslina Abdul Rashid  
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Youtube : <http://www.youtube.com/> (Search for:ITMA UPM)

Instagram : <https://www.instagram.com/institutteknologimaju/>

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## Director's Foreword

I am blessed for another opportunity to say a few words in Nanoscope 2018, our institute's annual magazine. Generally, this magazine is the medium to showcase the yearly achievements and activities of the researchers, research laboratories and students in ITMA. I would like to record ITMA's appreciation and gratitude to the editor, and all contributors in producing this issue.

As years pass by, we at ITMA have gone through many obstacles and challenges but we continually progress in line with the vision to become a research institute of international repute in the field of Nanotechnology and Advanced Materials. In 2018, ITMA has successfully organized several series of activities such as iSAMN2018, Mobility Programs to Thailand, Turkey, Japan and other collaborative programs with the industries. Besides sharing and gaining knowledge, those activities are also platforms to strengthen our networking and increase the visibility of ITMA and UPM at the national and international level.

I would like to extend my gratitude to all research associates and ITMA staff for supporting and contributing towards our overall development and achievement in 2018. I hope we will all continue to excel in our roles in steering ITMA's research to a higher level to ensure our competitiveness in the years to come.

**ASSOC. PROF. DR. MOHD. NIZAR HAMIDON**  
Director  
[mnh@upm.edu.my](mailto:mnh@upm.edu.my)

# Overview

The Institute of Advanced Technology (ITMA) is a multidisciplinary research institute in the field of Advanced Materials and Nanotechnology. ITMA focuses on areas such as materials synthesis and characterization, materials processing and technology, and materials applications in sensors and functional devices. It supports over 50 researchers and fellows, and over 100 post-graduate students.

ITMA has three main research laboratories, all within close proximity to ITMA's distinguished technology facilities. We make every effort to provide cutting-edge equipment to help our researchers carry out research of the highest standard.

## Vision | Mission

To become a research institute of international repute in the field of nanotechnology and advanced materials.

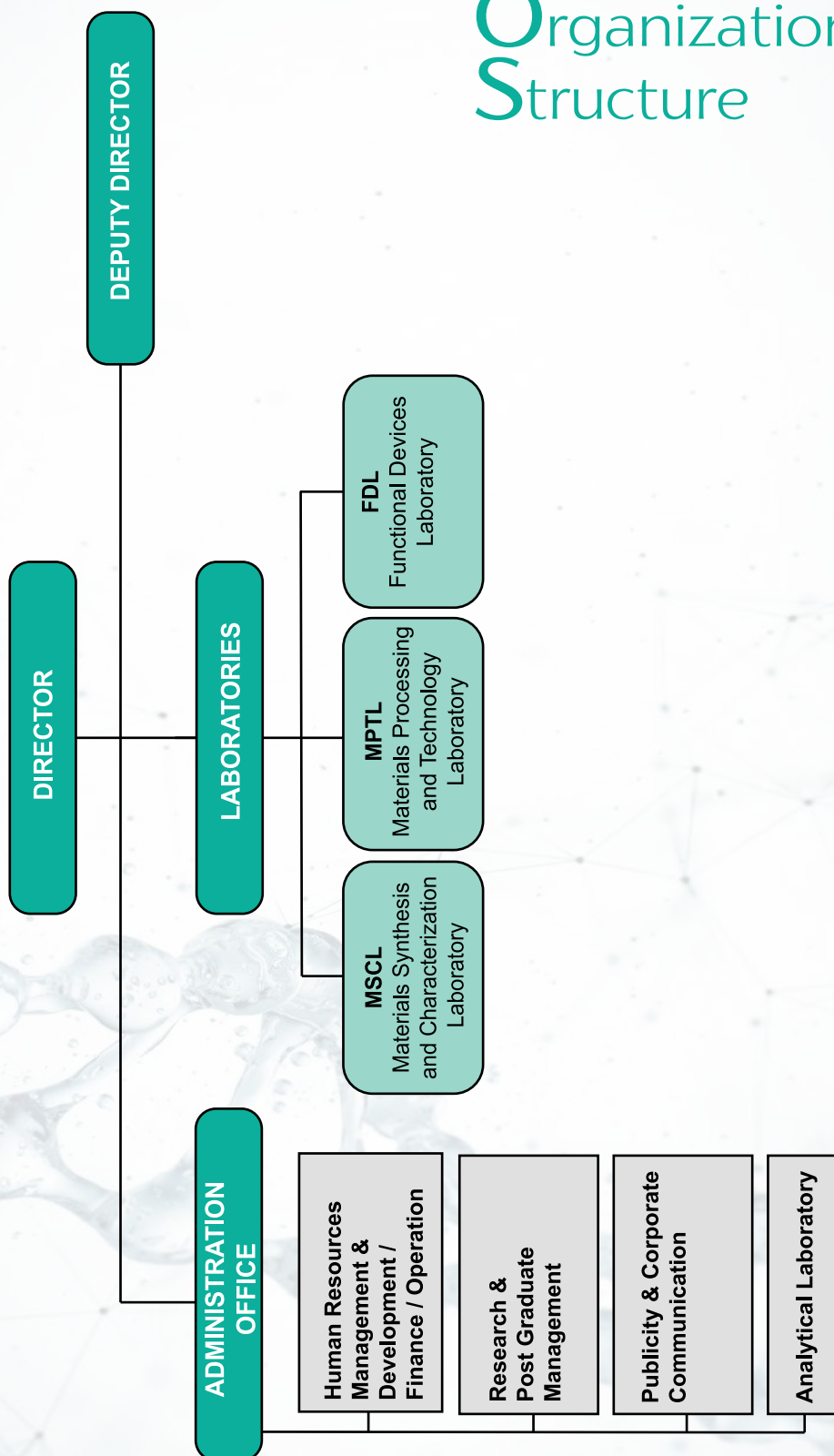
To contribute significantly towards wealth creation, nation building and universal human development through high impact research in nanotechnology and advanced materials.

## Goals

- To empower ITMA as a premier center of excellence by providing the best research infrastructures.
- To elevate achievements in research and innovation to international levels.
- To produce knowledgeable and competitive graduates.
- To strengthen the involvement of industry and community to wealth creation and sharing of knowledge.



# Organizational Structure



# ITMA Top Management



## Director

Assoc. Prof. Dr. Mohd Nizar Hamidon  
mnh@upm.edu.my



## Deputy Director

Assoc. Prof. Dr. Abdul Halim Abdullah  
halim@upm.edu.my



## Head of MSCL

Assoc. Prof. Dr. Janet Lim Hong Ngee  
hongng@upm.edu.my



## Head of MPTL

Assoc. Prof. Dr. Suraya Abdul Rashid  
suraya\_ar@upm.edu.my



## Head of FDL

Assoc. Prof. Dr. Suhaidi Shafie  
suhaidi@upm.edu.my



## Senior Assistant Registrar

Din Ayup  
dinayup@upm.edu.my



# Administrative Staff

## Human Resources Management & Development /Finance/ Operations

**Senior Assistant Registrar**  
Mr. Din bin Ayup

**Secretary**  
Ms. Khariza binti Abdul Wahab  
(*Director*)

Ms. Normah binti Ludin  
(*Deputy Director*)

**Administrative Assistant**  
Ms. Zamzurina binti Abdul Wahab  
(*Human Resources*)

Mr. Abd. Hakim bin Abdullah  
(*Financial Research*)

Ms. Norliyana binti Mahat  
(*Financial Management*)

Mr. Zuhairi bin Zainul Abidin  
(*Services management*)

Ms. Noor Linda binti Hassan  
(*Head of Laboratories Assistant*)

**Driver**  
Mr. Nor Azli bin Sulaiman

**Operation Assistant**  
Mr. Visanathan (*until February 2018*)  
Mr. Mahmood bin ismail  
Mr. Muhammad Fikrul Hasani bin  
Che Musa (*17 December 2018*)

## Research & Post Graduate Management

**Assistant Registrar**  
Ms. Norizanne binti Abd Rahim

**Administrative Assistant**  
Ms. Roslina binti Warno  
(*Research Management*)  
Ms. Rokiah binti Deraman  
(*Post Graduate Management*)

## Publicity & Corporate Communication

**Publication Officer**  
Ms. Marzieana binti Ab Rahman  
(*until 6 June 2018*)

**Executive Officer**  
Ms. Nursyahirah Amirah binti Mazlan  
(*17 October 2018*)

## Analytical Laboratory

**Science Officer**  
Ms. Nurnazeera binti Zulkefli  
(*Assistant Engineer*)  
  
Ms. Noor Lina binti Shamsuddin  
(*Assistant Engineer*)





ITMA develops 3 main research laboratories in the area of Advanced Materials and Nanotechnology, attracts renowned researchers and trains future research leaders in niche areas related to advanced materials and nanotechnology. ITMA shares its research findings, expertise and facilities with research communities and industries throughout the world.

# RESEARCH

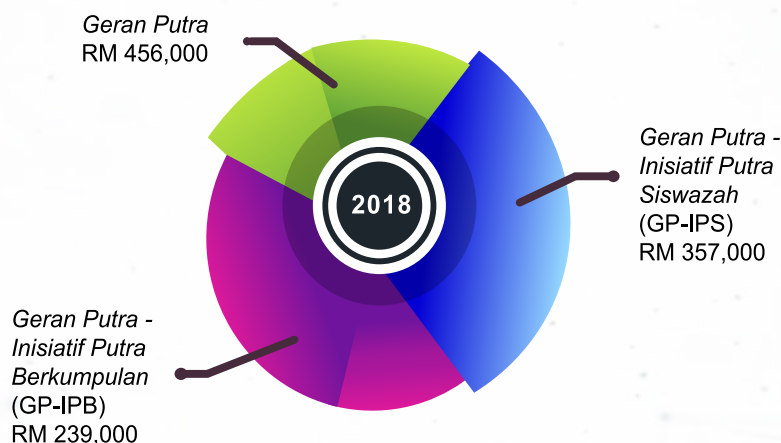




# Achievements

## Research Grants

The total revenue of ITMA's research funds in 2018 was MYR 1,248,700 from 18 projects.



## Publications

NO	ITEMS	ACHIEVEMENTS
1	Articles	171
2	Conference Proceedings	17
3	Percentage of Publication in Q1 & Q2	75%
4	Total number of research books	1
5	Total number of chapter books	4
6	Total number of patents	3

## Patents

NO	PATENT NAME	APPLICATION NO.	INVENTOR	COUNTRY
1.	An ion imprinted polymer monolith for heavy metal removal and method of preparation thereof	PI12018701885	Nor Azah Yusof	Malaysia
2.	Synthesis of Graphenated carbon nanotubes and Graphenated carbon	PI12018000596	Ismayadi Ismail	Malaysia
3.	Process for producing fungicide / fumigant Nano-delivery System for controlling Ganoderma Disease and Composition	PI12018703220	Mohd Zobir Hussein	Malaysia

## Awards

### MAJLIS APRESIASI PENYELIDIKAN (MAP) 2017

10 December 2018 (Auditorium Rashdan Baba, TNCPI Office, UPM)



**Excellent Institute Awards**  
Prize: Rm 30,000.00



**Research Officer Award**  
Dr. Ismayadi Ismail - Prize: Rm 10,000.00



**Research Laboratory Award**  
Materials Synthesis and Characterization  
Laboratory (MSCL)  
Prize: Rm 10,000.00

**Malaysia Commercialisation Year (MYC)**  
Main Award Assoc. Prof. Dr Janet Lim Hong Ngee  
Prize: Rm 130,000.00

**Versatile Graphene Product**





## Awards

### ITMA EXCELLENT RESEARCHER AWARD 3 July 2018 - (ITMA Seminar Room)

**Researchers by Laboratory Categories**  
Prize: RM 4,000.00 with certificate



Prof. Dr. Robiah Yunus (MPTL)



Assoc. Prof. Dr. Khamirul Amin Matori (MSCL)



Assoc. Prof. Dr. Jaafar Abdullah (FDL)

**Young Researcher Category :**  
Assoc. Prof. Dr. Yusran Sulaiman  
Prize: RM 3,000.00 with certificate



# Research Highlights

## HARVAST™ Photosynthesis Enhancer: A Nanotechnology Innovation From Carbon Dots

Photosynthesis is a process whereby green plants use light energy to convert water and carbon dioxide, into oxygen and sugar. Sugar is transported throughout the plant and supplied to tissues like leaves, roots, flowers and fruits for growth. However, photosynthesis is an inefficient process; only 2-4% of the available energy in light is converted into new plant growth. Plants do not absorb all incoming sunlight due to reflection, respiration requirements of photosynthesis and the need for optimal solar radiation levels.

The rapid development of nanotechnology research has resulted in innovation for various applications including agriculture. Carbon Quantum Dots or Carbon Dots (CDs) for short, are a member of the carbon nanomaterial family. They are fragments of carbon less than 10 nm in diameter which are inert. Research interest has focused on CDs because of their superior properties such as biocompatibility, photoluminescence and electron transfer ability. For the first time, the versatility and advantages of CDs has sparked an innovation by our researchers to use CD as a photosynthesis Enhancer, known as HARVAST™.

**Assoc. Prof. Dr. Suraya Abdul Rashid**  
Head of MPTL  
suraya\_ar@upm.edu.my



HARVAST™ contains the CDs, which is produced using bio-char (an organic charcoal). They have optical properties very similar to chlorophyll; which are the green pigments responsible for photosynthesis. When 'Photosynthesis Enhancer' solution is sprayed onto foliage, it penetrates leaves and interacts with chloroplasts (which contain chlorophyll). This interaction assists in the electron transfer mechanism of the photosystems, which leads to enhanced photosynthesis.

Through this innovation, the photosynthesis rate increases between 20 to 80 percent depending on the types of crop. The CDs help to transfer electron during the photosynthesis process, which can directly increase the rate of photosynthesis. The technology is focused on accelerating photosynthesis rate that can yield a better harvest compared to other plant growth enhancers available in the market which focus more on plant nutrient requirements and root growth. The photosynthesis rate also reduces the use of light and water consumption during the photosynthesis process. This technology has potential to be used in indoor and vertical farming as the photosynthesis process can be supported under visible light, minimizing the need for expensive LED lighting.

This simple and green innovation helps to increase growth rate, shortens growth cycle, increases leaf growth and hastens flowering, fruiting as well as yield.





# Research Highlights

## Thick Film Technology with Organic Binder for Printable Flexible Electronics

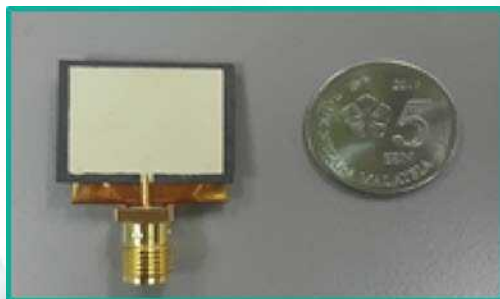
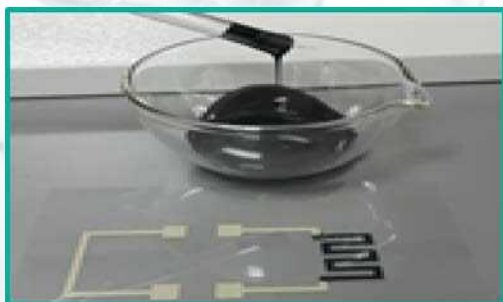
Have you been wondering if electronic circuits can be printed onto clothes or papers? The answer is yes, they can! Thick film technology is widely used to produce electronic devices due to its ease of fabrication. The technology utilizes screen printing method, which is the same method used to print designs on textiles such as t-shirts. Thick films are fabricated by printing a circuit design onto a substrate using a thick film paste, which is in a form of a highly viscous liquid that includes materials which determines the properties of the thick film. However, conventional pastes requires high temperatures to bind the active materials to the substrate, which makes them not suitable for use in printed flexible electronics, since the flexible substrates such as plastic films, papers and textiles cannot withstand high temperatures.

Our research work has been focusing on the innovation on the use of linseed oil as the organic binder or commonly called as organic vehicle to produce thick film paste that can be dried or fired at lower temperatures as compared to the conventional pastes. Linseed oil is often used as drying oil in paintings since it has boiling point of  $346^{\circ}\text{C}$ , making it suitable to be used for lower firing temperature. Linseed stand oil has higher viscosity compared to raw linseed oil, making it more suitable as the organic binder.

**Dr. Intan Helina Hassan**  
FDL Research Officer  
i\_helina@upm.edu.my



With this innovation, we can produce thick film pastes that can be fired at temperatures lower than  $300^{\circ}\text{C}$ , and still having significant properties related to the active materials used. One example is the use of ferrite thick film to enhance the performance of patch antenna, specifically the bandwidth of the antenna. When the thick film is layere in between a polymer film which acts as the substrate, and a silver patch that will radiate antenna's signal, it has proven to widen the bandwidth by more than 30%. This is a significant improvement for patch antenna which is always known to have issues with narrow bandwidth, and at the same time promoting potential fabrication of flexible or wearable antennas in near future.



# Research Highlights

## Agronanochemical For Basal Stem Rot Disease Management of Oil Palm

Nanotechnology research and development is likely to facilitate the next stage of development in the agricultural sector, especially for agricultural input and output. The use of the nanotechnology in agriculture or the so-called agronanochemistry can improve for example the physicochemical properties of the conventional agrochemicals, early detection of pests, and precision farming practices, which will directly contribute to the development of new functional materials, product development and design of methods and instrumentation for food safety and security. Recent advances in agronanochemistry have produced mastery in nanoparticle technology with wide ramifications in the field of agriculture. One area of agronanochemistry which could help the current problem in the up-stream palm oil industry is in the basal stem rot disease management.

*Ganoderma boninense* is a pathogenic fungus that causes basal stem rot (BSR) disease in oil palm. This disease is one of the critical issues causing low yields in the oil palm industry in Malaysia with an estimated loss of RM1.5 billion. Typically, fungicides such as hexaconazole and dazomet have been used to control BSR disease. However, it was reported that the use of the fungicides had increased soil acidity because the residue of hexaconazole fungicide in the soil sample was found to be double the recommended dosage. There is currently no effective way to ensure that the fungicide is only released at the fungal site instead of leaching out into the soil.

In this work, a fungicide-controlled release formulation was designed and synthesized in controlling the release of fungicides and subsequently reduce the acidity problem. This was accomplished by the intercalation of hexaconazole into the 2D interlamellae

**Prof. Dr. Mohd Zobir Hussien**  
MSCL Research Fellow  
mzobir@upm.edu.my



of ZALDH to form a nanocomposite of hexaconazole-ZALDH layered structure (HZALDH). Hexaconazole was selected in this work because it is widely introduced as a preventive treatment and prolongs the productive life of infected palms. In addition, it has the potential for dual-modal applications; a nanofungicide and a micronutrient supplier to support plant growth; Zn and Al are micronutrients which are the main components of the LDH brucite-like inorganic structure, could contribute to oil palm growth by supplying zinc and/or aluminium in shoots and roots.

The XRD pattern of hexaconazole-intercalated Zn/Al-LDH (HZALDH) nanocomposite (Figure 1) has a basal spacing of 8.7 Å, consistent with a monolayer of nitrate as the counter anion. The resulting nanocomposite has expanded from 8.7 to 29.4 Å, which indicates that the exchanged anion, hexaconazole has been intercalated into the intergalleries of ZALDH to replace nitrate. The parametric optimisation showed that the preparation using 0.2 M HZALDH displayed a sharp, symmetric, high crystallinity, indicating the pure product has been obtained. A slow scan PXRD of the sample, HZALDH exhibits eight harmonics; 29.45, 14.83, 9.65, 7.30, 5.84, 4.96, 4.25, and 3.67 Å as shown in Figure 1D, which produces an average basal spacing of 29.42 Å. This value was then used to predict the plausible arrangement of hexaconazole in the intergallery of HZALDH nanocomposite, as shown in Figure 2.

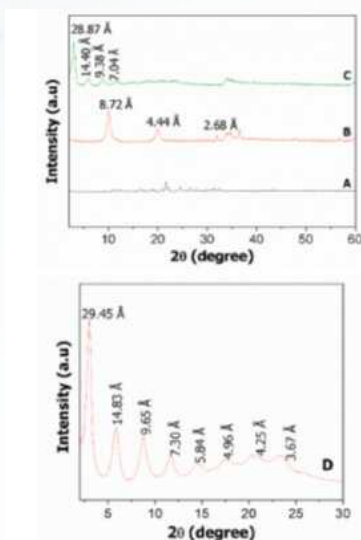


Fig. 1: PXRD patterns of free hexaconazole (A), ZALDH (B), and HZALDH nanocomposite (C), and the slow scan with a dwell time of 0.5°/min (D), and from the eight reflections, the average value of the interlamellae (nxd) was found to be 29.42 Å.

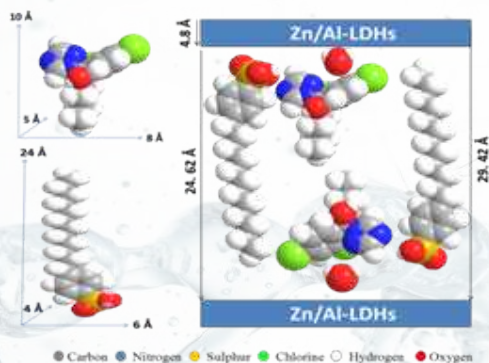


Fig. 2: Three-dimensional structure of hexaconazole (A), sodium dodecylbenzenesulfonate (B), and plausible arrangement of hexaconazole and sodium dodecylbenzenesulfonate in the intergallery of HZALDH nanocomposite (C)

The antifungal activity of free hexaconazole, ZALDH and HZALDH sample of different concentrations (0.001 to 10 ppm) toward *G. boninense* were studied. The inhibition zone of *G. boninense* by the samples are also illustrated in Figure 3 as a result of using probit analysis of Sigma Plot 10.0, the half maximal effective concentration, EC<sub>50</sub> was obtained. The values of EC<sub>50</sub> for hexaconazole, ZALDH and HZALDH were found to be 0.05, 2.03 and 0.03 ppm, respectively.

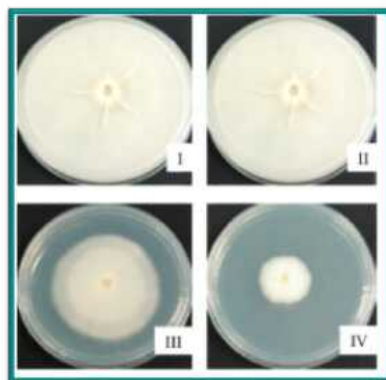


Fig. 3: The inhibition zone of *Ganoderma boninense* after 7 days at 0.05 ppm (E) in control (I), ZALDH (II), pure hexaconazole (III) and HZALDH nanocomposite (IV).

These findings indicate that the resulting nanodelivery system of hexaconazole developed in this work is more effective in combating *G. boninense* compared to its counterpart, the free hexaconazole, as indicated by the lower EC<sub>50</sub> value, 0.03 compared with 0.05 ppm, respectively. This shows that zinc/aluminum layer double hydroxide can be used as a nanocarrier for a fungicide, hexaconazole, in developing a potent and more environmentally friendly new generation of agronanochemical.

#### Acknowledgement:

This work was supported by the NanoMite grant; vot nos. 9443100 and 5526300.



# Laboratories

## Materials Synthesis and Characterization Laboratory (MSCL)



Materials Synthesis and Characterization Laboratory (MSCL) was established on 1st November 1999. It was formerly known as Advanced Materials Research Center (AMRC) and later was changed to Advanced Materials Laboratory (AML). In line with university's restructuring, its name was changed to Advanced Materials and Nanotechnology Laboratory (AMNL) in 2006. Recent restructuring in 2012 has seen AMNL evolving to Materials Synthesis and Characterization Laboratory (MSCL) to be in tune with advanced materials and nanotechnology research focus. This laboratory is one of the three research laboratories under the Institute of Advanced Technology (ITMA). MSCL focuses in three main activities ;

1. Interdisciplinary research and development work in advanced materials and nanotechnology.
2. Postgraduate research programs.
3. Dissemination of innovative knowledge and technologies in advanced materials and nanotechnology.

### Objective

1. To be a leading research centre in advanced materials and nanotechnology.
2. To develop world class research laboratory in advanced materials and nanotechnology. Postgraduate research programs.
3. To disseminate knowledge and innovative and technologies in advanced materials and nanotechnology.



## MSCL Research Group

### i) Nanomaterials

This program focuses on the synthesis and characterization of nanomaterials and their building blocks which involves the use of nanosized materials. The study of these materials covers the fundamental aspects towards their potential application. The research on nanocomposite materials and nanostructured materials includes but is not limited to nanometals, nanoalloys, nanoceramics, carbon nanotubes and layered double hydroxides.

### ii) Functional and Structural Materials

This program focuses on synthesis and characterization of advanced functional materials and also structural materials. The study of these materials covers the field of advanced materials such as electronic materials, magnetic and superconducting materials, dielectric ceramic materials, semiconducting materials, photonic materials, thin film materials and smart materials. It also focuses on advanced polymer-matrix composite, structural metallic alloy and ceramic.

### iii) Foundry of Reticular Materials For Sustainability (FORMS)

The Foundry of Reticular Materials for Sustainability (FORMS) is a long-term collaborative programme between Universiti Putra Malaysia and the University of California, Berkeley, America. This programme focuses on research involving the synthesis and applications of metal-organic frameworks (MOFs). The applications of MOFs include, but are not limited to materials science and technology, biosystems and biotechnology, agriculture, water, veterinary and animal science, energy, and health and medicine yield. It is a green technology.

## MSCL Laboratory Members

### Assoc. Prof. Dr. Janet Lim Hong Ngee

Head of Laboratory  
B.Sc (UKM), M.Sc (UKM), Ph.D (UPM)  
Expertise: Analytical Chemistry, Materials Chemistry

### Prof. Dr. Mohd Zobir Hussein

Research Fellow  
B.Sc (Hons) (UKM), Ph.D (Reading, U.K)  
Expertise: Nano Materials and Materials Chemistry

### Prof. Dr. Zainal Abidin Bin Talib

Research Associate  
B. Sc (Southern Illinois, US), M.Sc (Southern Illinois, US), Ph.D (Southern Illinois, US))  
Expertise: Electrical Characterisation of Matter, Materials Physics

### Assoc. Prof. Dr. Raba'ah Syahidah Aziz

Research Associate  
B.Sc (Hons) (Chemistry) (UKM), Ph.D (Chemistry) (UMIST, UK)  
Expertise: Electrochemistry, Materials Chemistry

### Assoc. Prof. Dr. Khamirul Amin Matori

Research Associate  
B.Sc (UPM), M.Sc (UPM), Ph.D (Sheffield, UK)  
Expertise: Materials Science, Materials Engineering, Ceramics

### Assoc. Prof. Dr. Abdul Halim Abdullah

Research Associate  
B. Sc (Hons) (New Brunswick), Ph.D (Dundee, U.K)  
Expertise: Analytical Chemistry, Catalysis, Environmental Chemistry, Materials Chemistry

### Assoc. Prof. Dr. Chen Soo Kien

Research Associate  
B.Sc (UKM), M.Sc (UKM), Ph.D (Cambridge, UK)  
Expertise : Superconducting Materials

### Assoc. Prof. Dr. Normi Mohd Yahaya

Research Associate  
B.Sc (USM), Ph.D (Riken, Saitama, Japan)  
Expertise: Molecular & Structural Biology

### Assoc. Prof. Dr. Thahira Begum

Research Associate  
B.Sc (Brunei), M.Sc (UPM), Ph.D (UPM)  
Expertise: Synthesis

## MSCL Laboratory Members

### **Assoc. Prof. Dr. Raba'ah Syahidah Aziz**

Research Associate  
B.Sc (UPM), M.Sc (UPM), Ph.D (Warwick, UK)  
Expertise: Ceramics, Magnetic Materials, Nuclear Magnetic Resonance

### **Assoc. Prof. Dr. Emilia Abd Malek**

Research Associate  
B.Sc (Hons) (UMIST), Ph.D (Oxford)  
Expertise: Natural Products Chemistry, Synthesis

### **Dr. Nurul Huda Osman**

Research Associate  
B.Eng (Surrey, UK), Ph.D (Surrey, UK)  
Expertise: Microwave Planar Components, Material Characterisation, Sensor Design

### **Dr. Che Azurahaman Che Abdullah**

Research Associate  
B.Sc (USM), Ph.D (Surrey, UK)  
Expertise: Materials for Biomedical Applications, Nanotechnology

### **Dr. Hafiz Ibrahim**

Research Associate  
Ph.D (UPM)  
Expertise: Plant Ecophysiology

### **Assoc. Prof. Dr. Mas Jaffri Masarudin**

Research Associate  
M.Sc (UPM), Ph.D (La Trobe, Australia)  
Expertise: Nanobiotechnology, Drug delivery, Anticancer Therapeutics, Microbial-Synthesis of Nanomaterials

### **Dr. Norlaily Mohd Saiden**

Research Associate  
B.Sc (UPM), M.Sc (UPM), Ph.D (Sheffield, UK)  
Expertise: Magnetics Materials

### **Dr. Farid Ismail**

Research Associate  
B.Sc (Oklahoma), M.Sc (Oklahoma), Ph.D (Oklahoma)  
Expertise: Computational Chemistry

### **Dr. Josephine Liew Ying Chyi**

Research Associate  
B.Sc (UTM), M.Sc (UPM), Ph.D (UPM)  
Expertise: Semiconductor Materials Characterisation, Synthesis, & Utilisation

### **Prof. Dr. Mohd Basyaruddin Abdul Rahman**

Research Associate  
B.Sc (UTM), Ph.D (Southampton)  
Expertise: Theoretical and Computational Chemistry, Catalysis, Synthesis, Oleochemistry

### **Prof. Dr. Taufiq Yap Yun Hin**

Research Associate  
B.Sc (UPM), Ph.D (UMIST)  
Expertise: Natural Product Chemistry, Catalysis

### **Prof. Dr. Sidek Ab Aziz**

Research Associate  
B.Sc (UKM), Ph.D (Bath, UK)  
Expertise: Glass, Ceramics, Oxide Glasses, Glass Ceramics, Acoustic

### **Dr. Ismayadi Ismail**

Research Officer  
B.Sc (UKM), M.Sc (UPM), Ph.D (UPM)  
Expertise: Magnetic Materials, EM-wave Absorbing Materials, Carbon Nanostructures

### **Rosnah Nawang**

Research Officer  
B.Sc (USM), M.Sc (USM)  
Expertise: Bioceramics, Bone Regeneration

### **Dr. Idza Riati Ibrahim**

Post-Doctoral  
B.Sc (Hons) (UPM), M.Sc (UPM), Ph.D (UPM)  
Expertise: Nanomaterials and Nanotechnology, Magnetic Materials

### **Sarinawani Abdul Ghani**

Science Officer  
B.Sc (Hons) (UPM)

### **Nazrul Abdullah**

Assistant Engineer  
Dip. Eng (Mechanical), B. Eng (Mechanical)

### **Mohd Kadri Masaud**

Assistant Engineer  
Cert. Eng (Relationship), Dip. Eng (Electronic)



# Laboratories

## Materials Processing and Technology Laboratory (MPTL)



Materials Processing and Technology Laboratory (MPTL) was established to fulfill the research necessity in Advanced Materials Processing and Nano Materials. MPTL was developed to complement the ITMA ecosystem, which aims to be a leader in the field of Nanotechnology and Advanced Materials. MPTL focuses on developing and promoting research in Materials Technology and Advanced and Nano Materials Processing in Malaysia. The main activities of the laboratory are :

1. Conducting research in related fields. research programs.
2. Postgraduate research programs.
3. Provide trainings and consultancy services.

### Objective

1. To be a leading research center in processing and technology for advanced materials and nanomaterials.
2. To produce experts in the field of processing and technology for advanced materials and nanomaterials.
3. To be a knowledge dissemination center of processing and technology for advanced materials and nanomaterials.
4. To build a network of strategic partnership between local and international researchers from public and private institutions.

## MPTL Research Group

### i) Materials Processing

This program focuses on developing research related to scalable processing of advanced materials and nanomaterials. We have expertise in synthesis of carbon nanostructures such as carbon nanotubes (CNT) and CNT cotton by both batch and continuous chemical vapour deposition (CVD) processes. The existing know how and facilities in CVD processing open other venues for research such as superconductor thin film and bottom-up synthesis of graphene and homologous graphene. Scalable top-down processes for preparation of graphene oxide and graphene quantum dots are also being actively pursued. Other scalable processes for synthesis of advanced materials and nanomaterials include hydrothermal and solvo thermal approaches.

### ii) Nanomaterials Technology

This program focuses on the development of innovative products using advanced materials and nanomaterials for various applications. The different types of nanomaterials used include carbon based nanostructures such as carbon nanotubes (CNT), graphene oxide and reduced graphene oxide, graphene quantum dots as well as other various types of metal oxide nanoparticles. The products being developed are diverse and include nanofluids such as nanomaterial enhanced drilling fluids and heat transfer fluids for microfluidics, nanoemulsion systems such as nanoemulsion fuels and pesticides, a wide range of nanocomposites, nanocatalysts, nanocoatings and smart materials. The nature of research under this program ranges from fundamental studies to applied research to proof of concept and performance testing.

## MPTL Laboratory Members

### Assoc. Prof. Dr. Suraya Abdul Rashid

Head of Laboratory  
B.Eng (Hons) (Nottingham, UK), Ph.D (Imperial College London, UK)  
Expertise: Nanotechnology & Nanomaterials

### Dr. Umer Rashid

Research Fellow  
B.Sc (Pakistan), M.Sc Chemistry (Pakistan), Ph.D (Pakistan)  
Expertise: Renewable Energy (Biodiesel)

### Prof. Dr. Robiah Yunus

Research Associate  
B.Sc (Alabama), M.Sc (Leeds), Ph.D (UPM)  
Expertise: Biolubricants, Palm Oil Products and Process Development, Biofuel, Carbon Fiber Reinforced Composites

### Prof. Dr. Luqman Chuah Abdullah

Research Associate  
B.Sc (Hons) (UTM), Ph.D (Birmingham)  
Expertise: Separation Technology, Chemical & Environmental Technology, Material Engineering (Polymer) and Particle Technology

### Assoc. Prof. Dr. Nor Azowa Ibrahim

Research Associate  
B.Sc (Kansas, USA), M.Sc (Illinois, USA), Ph.D (UPM)  
Expertise: Polymer Chemistry, Environmental Chemistry

### Assoc. Prof. Dr. Mohamad Amran Mohd Salleh

Research Associate  
B.Eng.Sc. (Western Ontario), Ph.D (Birmingham)  
Expertise: Particle Technology, Biochar and Nanotechnology, Carbonaceous Particulates

### Dr. Dayang Radiah Awang Biak

Research Associate  
B.Sc (Eng) (CWRU), USA, Ph.D (Birmingham, UK)  
Expertise: Heat Transfer, Modelling, Food Processing, Crystallisation, Pharmaceutical Products

### Dr. Siti Hajar Othman

Research Associate  
B.Eng (Vanderbilt, USA), Ph.D (UPM)  
Expertise: Nanotechnology and Nanomaterials, Packaging Engineering



## MPTL Laboratory Members

### Dr. Shafreeza Sobri

Research Associate

B.Eng (Hons) (UTM), Ph.D (Newcastle)

Expertise: Electrocristallisation and Electrochemical Engineering

### Dr. Faizah Mohd Yasin

Research Associate

B.Eng (Hons) (UMIST), M.Sc (UPM), Ph.D (Western, Australia)

Expertise: Nanotechnology, Advanced Materials

### Dr. Nordin Hj. Sabli

Research Associate

B.Eng (TUT), M.Eng (UPM), Ph.D (UPM)

Expertise: Photoelectrochemical cell, Fuel Cell

### Dr. Tan Tong Ling

Post Doctoral

B.Sc (Hons) (UNIMAS), Ph.D (UM)

Expertise: Carbon Nanomaterials, Photocatalysis

### Dr. Siti Zulaika Razali

Research Officer

B.Eng (UKM), M.Sc (UPM), Ph.D (UPM)

Expertise: Biobased products, Nanotechnology, Drilling fluid

### Juraina Md Yusof

Research Officer

B.Eng (USM)

Expertise: Carbon Nanomaterials, Carbon Particles, Piezoelectric Materials

### Mohd Ali Mat Nong

Research Officer

B.Eng (UPM)

Expertise: Nanoelectronics, Solar Cell, Nanomaterials

### Roslina Abdul Rashid

Science Officer

B.Sc (Hons) (UPM)

### Ab Haffiz Ab Jalil

Assistant Engineer

Dip. Eng (Politeknik SSAAS)

### Zakky Yamanie Jamiauddin

Assistant Engineer

Dip. Eng (Politeknik TSM Kulim)



# Laboratories

## Functional Devices Laboratory (FDL)



Functional Devices Laboratory (FDL), formerly known as Sensor Technology Laboratory (STL) was restructured and renamed to be in line with ITMA's current ecosystem. The laboratory aims to be a leader in sensor technology and electron devices using nanotechnology and advanced materials. The main activities of the laboratory are conducting research in related fields, postgraduate programs, as well as providing trainings and consultancy services.

### Objective

1. To be a leading research center in sensor technology and electron devices for advanced materials and nanomaterials.
2. To produce experts in the field of sensor technology electron devices for advanced materials and nanomaterials.
3. To be a knowledge dissemination center of sensor technology and electron devices for advanced materials and nanomaterials.
4. To build a network of strategic partnership between local and international researchers from public and private institutions.
4. To build a network of strategic partnership between local and international researchers from public and private institutions.



## FDL Research Group

### i) Sensor Technology

Sensor technology includes the study and preparation of sensing material and characterized by related transducer, signal processing and design of system or devices (including micro and nanoscale) in development of sensor to meet society and industrial demands. Sensor system includes (but not limited to) electronic sensors, biosensors, and chemical sensors. Sensor technology has a very important role as the key technology to support a wide variety of research and industrial applications. It is also a vital element that can be applicable to water security, environment and green technology.

### ii) Electron Devices

Electron Devices is a program that has been offered under this laboratory starting from 2012. This program aims to perform basic and applied research in the growth of semiconductors and related electronic materials, as well as micro analysis with the aim of developing new and improved electronic devices. The vision in this area is next generation electronic devices and sensors for improved performance and reliability in complex environments. Research areas include nanoelectronics and MEMS, RF and energy harvesting.

## FDL Laboratory Members

### Assoc. Prof. Dr. Suhaidi Shafie

Head of Laboratory  
B.Eng (Ryukyus), M.Sc (TUAT, Japan), Ph.D (Shizuoka, Japan)  
Expertise: CMOS Image Sensor, Porous Silicon, Solar Cell, VLSI Design, Analog TV/VCR Tuners

### Dr. Amir Reza Sadrolhosseini

Research Fellow  
B.Sc (Tehran, Iran), M.Sc (Azad, Iran), Ph.D (UPM)  
Expertise: Nanomaterials, Plasmonic and Optic Sensors

### Prof. Dr. Nor Azah Yusof

Research Associate  
B.Sc (Hons) (UKM), Ph.D (UKM)  
Expertise: Analytical Chemistry, Electrochemistry, Environmental Chemistry

### Assoc. Prof. Dr. Mohd Nizar Hamidon

Research Associate  
B.Sc (UM), M.Sc (UKM), Ph.D (Southampton, UK)  
Expertise: Microelectronics (Sensor Technology) MEMS, Devices Fabrication and Packaging, Wireless System

### Assoc. Prof. Dr. Jaafar Abdullah

Research Associate  
B.Sc (Hons) (UKM), Ph.D (UKM)  
Expertise: Analytical Chemistry

### Assoc. Prof. Dr. Norhafiz Azis

Research Associate  
B.Eng (UPM), PhD (Manchester, UK)  
Expertise: Transformer Condition Monitoring, Insulation Ageing and Diagnostics, Asset Management and Alternative Insulation Materials for High Voltage Power Equipments

### Assoc. Prof. Dr. Yusran Sulaiman

Research Associate  
BSc (Hons) (UTM), Ph.D (Durham)  
Expertise : Analytical Chemistry, Electrochemistry, Materials Chemistry

### Dr. Yap Wing Fen

Research Associate  
B.Sc (UPM), Ph.D (UPM)  
Expertise: Optical Sensor Based on surface plasmon resonance technique, Optical Studies on Glass Ceramics Composite Materials, Optical Properties of Nanocomposite Thin Film, Physics Literacy, Simulation & Multimedia



## FDL Laboratory Members

### Assoc. Prof. Dr. Wan Zuha Wan Hasan

Research Associate

B.Sc (Hons) UPM), M.Sc (UPM), Ph.D (UKM),

Expertise: Analytical Chemistry

### Dr. Mohd Nazim Mohtar

Research Associate

B.Eng (Hons) (Surrey), Ph.d (Surrey)

Expertise : Niomedical Nanoelectronics

Engineering, Lab on a Chip, Energy Harvesting

### Dr. Suriati Paiman

Research Associate

B.Sc (UTM), M.Sc (UTM), Ph.D (ANU, Australia)

Expertise : Nanowires, MOCVD, Indium Phosphide

### Dr. Haslina Jaafar

Research Associate

B.Eng (UKM), M.Sc (UKM), Ph.D (MEMS) (USM)

Expertise: Flexible Sensors & Electronics,

Micro-Electro Mechanical Systems (MEMS),

Carbon Nanomaterials and Embedded Systems

### Dr. Amrallah Mustafa

Research Associate

B.Eng (UPM), M.Sc (UPM), Ph.D (Eng) (Shizuoka, Japan)

Expertise: Solar Cell, CMOS Image Sensors, Analog IC Design, Robotics

### Dr. Sharul Ainliah Alang Ahmad

Research Associate

B.Sc (Hons) (UPM), Ph.D (Sheffield)

Expertise: Analytical Chemistry

### Dr. Intan Helina Hasan

Research Officer

B.Sc (Yokohama National University), M.Sc (UPM),

Ph.D (UPM)

Expertise: Electron devices, Thick Film Technology, Printed Electronics

### Rosiah Osman

Research Officer

Dip. Ed (Hons) (UKM), B.Sc (Electrical Eng) (USA),

M.Sc (UPM)

Expertise: Electrical and Electronics Engineering, Materials Science

### Dr. Nor Hapishah Abdullah

Post Doctoral

B.Sc (Hons) (UPM), M.Sc (UPM), Ph.D (UPM)

Expertise: Magnetic, Ferrite, Multiferroic, Nanomaterials, Ferroelectric and Dielectric Materials

### Md. Ali Rani

Science Officer

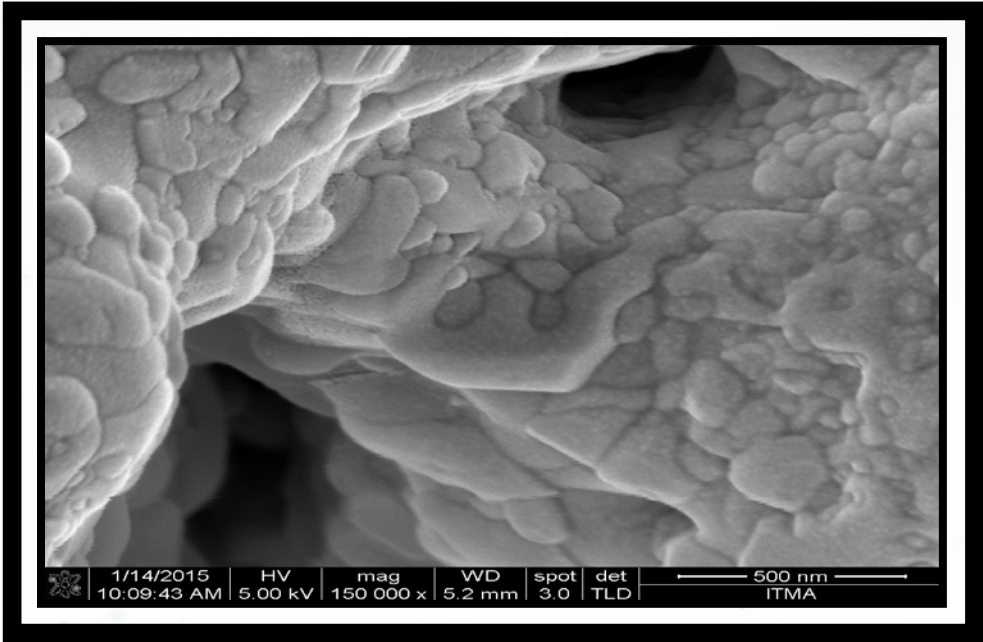
B. Sc (UPM)

### Mohd Wafi Azimin Muhammad Jan

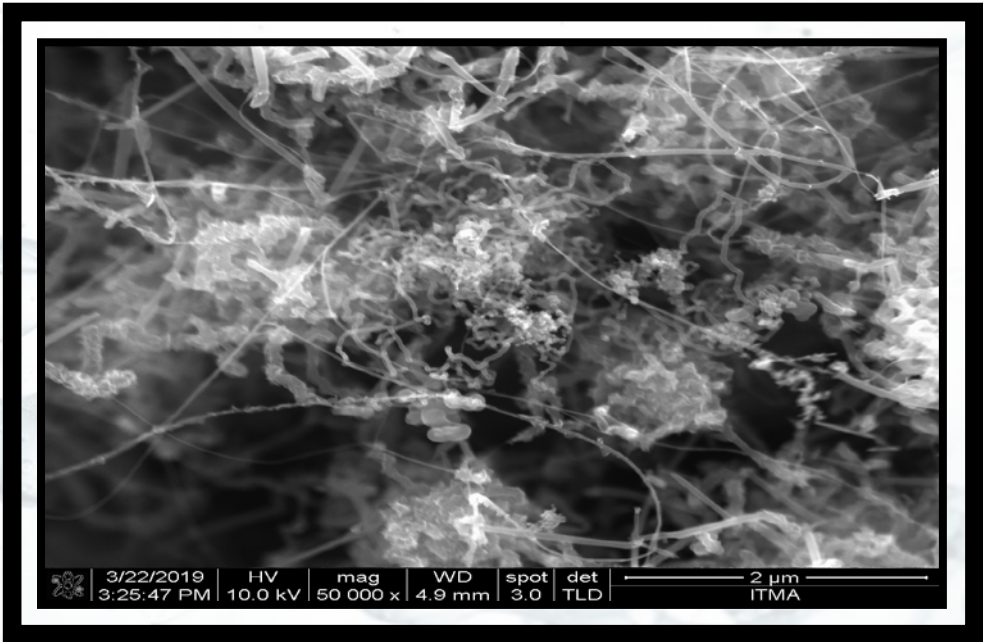
Assistant Engineer

Cert. Eng.





Zinc Silicate-based glass ceramics doped with Europium



Carbon Nanotube (CNT) Cotton

ITMA provides opportunities to Graduates to enhance their knowledge and training in research and development (R&D) by pursuing Higher Degree Studies at MSc. and Ph.D levels. ITMA offers various fields of study in the area of Advanced Materials and Nanotechnology.

# POST-GRADUATE





# Fields of Study

## Nanosciences

Nano-size materials exhibit novel and superior physical and chemical properties phenomena and processes, which are different from those of bulk materials. Metal nanoparticles have been intensively studied recently due to their novel optical, electronic, magnetic and electrochemical properties. In particular, silver nanoparticles have many potential applications in optical waveguides, optical switches, molecular identification catalysis, pronounced surface plasmon resonance absorption, surface enhanced Raman scattering and surface enhanced fluorescence. The properties of metal nanoparticles depend on several factors such as the electron density, size and shape of the nanoparticles, dielectric constant of the medium. The group has embarked on the preparation of polymer/metal nanocomposites by reduction of g radiation, chemical and physical methods.

Various characterization techniques are employed including SEM, TEM, XRD, UV-visible spectroscopy and electrical properties. Carbon Nanotubes (CNTs) Nanotechnology has become one of the most important and exciting forefront fields. Various devices in the nanoscale will be created in the near future. Demands for nanosized materials are increasing due to new inventions and innovations in nanotechnology. One of nanomaterials that have garnered the interest of researchers in the world is CNTs which deemed to change the scale of our current equipment. Based on the need of rising interests in synthesizing CNTs for nanotechnology, commercial PLAD systems and components with low start-up cost must also reached the market. We have designed an inexpensive new chamber for the pulsed laser ablation deposition (PLAD) system to synthesis carbon nanotubes (CNTs). A T-shaped steel vacuum chamber was designed which has a cylindrical shape, with diameter of about 15cm and 45cm length. CNTs were formed by ablating the graphite pellet mixed with catalysts using the laser. Immediately the hot vapor plume is formed and expands then cools rapidly during the ablation process. Vaporized small carbon molecules condensed on the substrate to form CNTs. Another interesting nanomaterial produced by our system is web-like Fe<sub>2</sub>O<sub>3</sub> with a diameter less than 17 nm and cotton-like Bi<sub>2</sub>O<sub>3</sub>. The same PLAD system developed in-house was used and parameters were retained as CNTs.

## Sensor Technology Engineering

Sensor Technology Engineering is the design and development of sensors to meet the need of the growth in products and services that utilize information from different types of sensors. Sensor technology has a very important role as the key technology to support a wide variety of research and industrial application. It is also a vital element that can be applicable in agriculture, water security, environment and green technology. The term is applied mostly in development of sensor networks, which also include wireless sensor networks (WSN). Although sensors can include electronic sensors, biosensors, and chemical sensors, the focus will be on the development and design of the electronic sensors.

## Advanced Materials Engineering

Advanced Materials Engineering is designed to train students in the materials and processes fields, for the purpose of integrating them in high-tech and traditional technological industries or in materials research at advanced degree levels. This program aims at preparing students with in-depth multi disciplinary knowledge, current issues and practices in the field of Advanced Materials such as composite, ceramic, electronic materials, magnetic material, smart material, plastic and polymer.

## Green Engineering

Green Engineering is the process and design of products that conserve natural resources, and impact the natural environment as little as possible. The term is often applied to system or device that requires engineering, and incorporates sound environment principles. Though green engineering is somewhat more expensive, many countries, recognizing the value of such work, have begun to offer tax breaks, and other incentives to those who incorporate its use.

## Nanotechnology

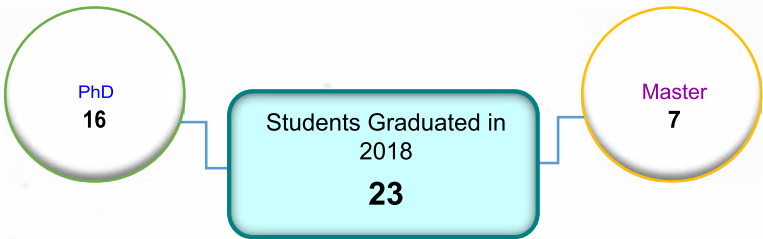
This program aims at preparing students with knowledge related to Nanotechnology which deals with developing materials, devices, or other structures possessing at least one dimension sized from 1 to 100 nanometres. Nanotechnology is the study of manipulating matter on an atomic and molecular scale. Nanotechnology entails the application of fields of science as diverse as surface science, organic chemistry, molecular biology, semiconductor physics, microfabrication. Some of typical applications of nanotechnology are in sensor, in delivery system, nanoabsorbents, nano electronic, nano machine, nanocomposites, nanotubes, and nanocarbons.

## Energy Engineering

The field of energy engineering covers both fundamental and applied research that involves development, design and usage of alternative energy, renewable energy and sustainable technology. Renewable energy covers solar, wind, hydro, tidal, biomass and hydrogen energies. Research areas for renewable energy covers machine development, instrumentation, energy generation, energy storage that are environmentally friendly. For development of solar energy system, its instrumentation covers solar tracking device, modification of stirling engine, water drainage system, solar mirrors and smooth operation for the energy generation for a solar bowl. Wind farm requires a generation system, energy distribution and energy storage facilities. Development of gasifier and purification of synthesis gas for generation of electrical energy direct from oil palm biomass and generation of gases from biomass and some aspects of biomass energy generation. Animal tracking system and development of automatic methane gas generation are challenges for this research. Development of smart window, smart chimney and use of photo voltaic in creating a healthy indoor environment are part of sustainable technology. Students are required to take courses in related fields as stated and to conduct research as well as presenting research results in seminars.

Student Graduated

23 students graduated in 2018; 16 graduated with PhD and 7 with Masters.



Student Enrollment

141 students enrolled in 2018; 72 enrolled for PhD and 69 for Masters.

PROGRAM	NATIONALITY	NO. OF STUDENT	TOTAL
Ph.D	Malaysia	60	72
	Iran	5	
	Iraq	3	
	Nigeria	4	
Master	Malaysia	61	69
	Iraq	2	
	Nigeria	3	
	Yemen	1	
	China	1	
	Bangladesh	1	

Student Admission

27 students registered in 2018; 11 registered for PhD and 16 for Masters.

PROGRAM	NATIONALITY	NO. OF STUDENT	TOTAL
Ph.D	Malaysia	11	11
Master	Malaysia	13	16
	Bangladesh	1	
	Iraq	1	
	China	1	



## Mobility Programs

Through mobility program, students can expand their personal horizons and fulfill their potential by taking part in global education. Various options are offered, such as short summer school courses, internships and field camps as well as practical training and research in the field of science and technology. Students will benefit greatly from their understanding of the history, culture of the country themselves. They will also understand the education system, and will improve the language skills and learn new languages through friendships with new friends, indirectly enhances communication capabilities.

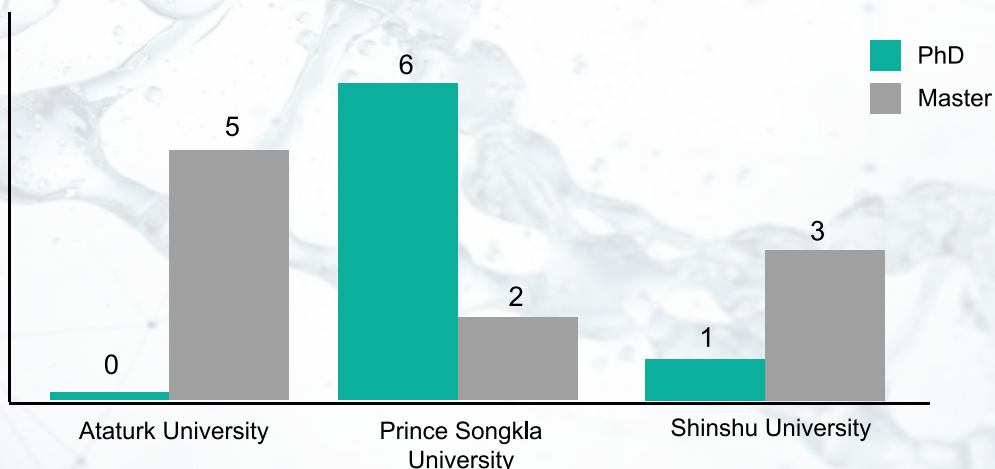
### Inbound Mobility Programs

37 students involved in Inbound Mobility Program

COUNTRY	HOST UNIVERSITY	PROGRAM	NO. OF STUDENTS
Japan	Kanagawa University	English Learning Program in 2018	19
Japan	KYUTECH	DSSC	12
India	National Institute of Technology Karnataka	Summer Internship	3
India	Addis Ababa University, Ethiopia	Summer Internship	1
Turkey	Erzurum Technical University	Mobility Program	1
Turkey	Ataturk University	Mobility Program	1

### Outbound Mobility Programs

17 students involved in Outbound Mobility Program



# Program for Post Graduate



## Postgraduate Seminar on "Viva Voce"

April 6, 2018

Facilitator : i) Prof. Dr. Nor Aini Ab Shukor  
ii) Dr. Nor Hapishah Abdullah  
iii) Dr. Tan Tong Ling

Objective : Exposing students to the viva process in UPM, as well as the necessary preparations before taking the viva session.

## The NLP Seminar Themed "Rewiring your brain, unleash your potential"

August 1, 2018

Facilitator : Dr. Che Azurahaman Che Abdullah

Objective : To help researchers whether postgraduate students or supervisors in terms of improving communication skills between students and supervisors, building effective communication, forming a mind set as a researcher and realizing the purpose of life and how to achieve it.



## Workshop on Management of Emotion during Postgraduate Studies

August 29, 2018

Facilitator : i) Ms. Rafidah Sadarudin  
ii) Dr. Siti Uzairiah Mohd Tobi

Objective : Tips sharing with the postgraduate on how to manage emotion and overcome stress during their studies.

ITMA establishes relationships with local and international industries and communities as well as universities through various activities, so that ITMA can contribute to human progress through the exploration and transfer of knowledge in the areas related to it. In addition, this network is intended to enhance ITMA's visibility as a leading center in industry and community partnerships.

# LINKAGES & NETWORKING





# Industry Linkages

56 projects with various industries were recorded in 2018

Level of engagement	Number of Projects
3 stars	11
2 stars	13
1 star	30
0 star	2
TOTAL	56



Khai Lien Silk Screen Suppliers (M) Sdn. Bhd.



Kuala Gandah Elephant Conservation Centre

# Community Program

## UPM Knowledge Transfer Program; Markas Kecemerlangan PPSR 2018

Communities involved:

- i. Jawatankuasa Belia & Sukan dan Sumber Manusia Negeri Terengganu
- ii. Jawatankuasa Kemajuan dan Keselamatan Kampung Tok Lawit & Kemajuan Rukun Tetangga Kg. Tok Lawit

Date of Event : 30 March 2018 - 1 April 2018

Program Leader : Assoc. Prof. Dr. Lim Hong Ngee



## Tunas Scientist Guidance Program

Community involved : *Maktab Rendah Sains MARA (MRSM) Muar*

Date of Event : 1 January 2017 - 31 December 2018

Program Leader : Assoc. Prof. Dr. Mohd Nizar Hamidon





# Mobility Program

## Mobility Program to Erzurum, Turkey

Institutions:

- i) Atartuk University
- ii) Erzurum Technical University

Date:

17 November to 1<sup>st</sup> December 2018

This mobility program has not only strengthened the relationship between ITMA, UPM and Atartuk University, but also provided valuable opportunities and experience to all participants in terms of networking, knowledge sharing and exposure to local culture, language and food. The warmest gratitude is dedicated to Prof. Dr. Mehmet Ertugrul for the good hospitality throughout the stay in Erzurum, Turkey.



## Mobility Program to Songkhla

Institutions:

Prince Songkla University

Date:

January 2018

This is the 2<sup>nd</sup> ITMA mobility program to Prince Songkhla University, Thailand. Besides the campus tour, there were lectures and presentations as well as training on image processing with raspberry and microcontroller. The participants also gained experience in celebrated the Songkran Festival, a local annual festival which celebrated at the end of the program.





# Visiting Scientist/Expert

ITMA has invited numerous local and international experts to our workshops, seminars, technical talks, and international mobility programs. These activities, events and programs are one of the strategies for expanding and strengthening our networking and visibility with other institutions. Below is the list of visiting scientists and experts who have participated in the events.

NAME	INSTITUTIONS	PROGRAM
Prof. Mehmet Ertugrul	Ataturk University,	Porous Silicon and Optical Sensor Application Workshop
Dr. Tevhit Karacali	Erzurum Turkey	
Prof. Muammer Yaylali	Erzurum Technical University, Turkey	
Prof Morinobu Endo	Shinsu University, Japan	Distinguished Lecture and Collaboration (DLC) Series 4.0 - Nanocarbon Innovation for The 21st Century International Symposium on Advanced Materials and Nanotechnology (i-SAMN 2018)
Prof. Dr. Noorhana yahya	Universiti Teknologi Petronas	International Symposium on Advanced Materials and Nanotechnology (i-SAMN 2018)
Prof. Dr. Shaobin Wang	Curtin University, Australia	
Prof. Dr. Yousheng Tao	Haixi Institutes, Chinese Academy of Sciences (CAS), China	
Assoc. Prof. Dr. Nattha Jindapetch	Prince of Songkla University, Hat Yai, Songkhla, Thailand	
Dr. Matthana Khangkhamano		
Prof. Dr. Coskun Kocabas	University of Manchester, UK	
Prof. Dr. Oguz Gulseren	Bilkent University, Turkey	
Assoc. Prof. Dr. Muhammad Asif Hanif	University of Agriculture, Faisalabad, Pakistan	
Dr. Muhammad Amin Sulthoni	Institute of Technology Bandung, Indonesia	
Dr. Akhmadi Surawijaya		
Prof. Ir. Dr. Abdul Rahman Mohamed	Universiti Sains Malaysia (USM), Pulau Pinang	
Prof. Dr. Ishak Ahmad	Universiti Kebangsaan Malaysia (UKM), Bangi	
Dr. Wutthikrai Busayarporn	Synchrotron Technology by and from Synchrotron Light Research Institute (SLRI), Thailand.	Seminar on Synchrotron Characterizations
Dr. Pat Photongkam		
Dr. Rozan Mohamad Yunus	Universiti Kebangsaan Malaysia (UKM), Bangi	Materials Characterization Seminar (MaChaS1.0): Raman Spectroscopy & Fourier Transform Infrared (FTIR)

# MoU/MoA

The strategic alliances and cooperation forged between universities and the private sector is a great initiative to have a platform to share expertise in the area of research, teaching and professional services.

## List of MoU

BIL	COUNTRIES	ORGANIZATION	SIGNATURE DATE	EXPIRED DATE
1	Malaysia	Scomi Oiltools Sdn Bhd	15 November 2013	15 November 2018
2	United Arab Emirates	United Arab Emirates University (UAEU)	9 July 2015	9 July 2020
3	Iran	Materials and Energy Research Center (MERC)	21 August 2017	21 August 2022
4	Turkey	Erzurum Technical University, Turkey	20 November 2018	20 November 2023
5	Turkey	Ataturk University, Turkey	2 April 2018	2 April 2023

## List of MoA

BIL	COUNTRY	ORGANIZATION	SIGNATURE DATE	EXPIRED DATE
1.	Malaysia	Human Life Advancement Foundation	21 April 2017	21 April 2020



HumanLife  
Advancement Foundation



MERC  
Materials and Energy Research Center



جامعة الإمارات العربية المتحدة  
United Arab Emirates University

Scomi  
Scomi Energy Services

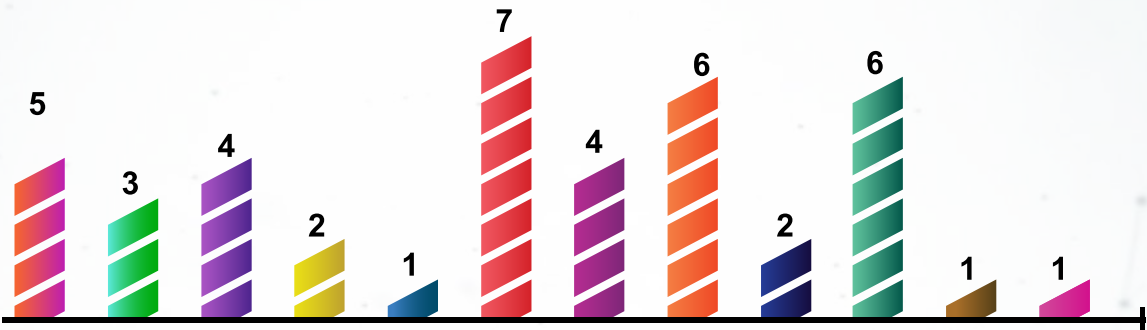
ITMA is supported by a group of dedicated staff to facilitate the overall operation of the institute's functions and activities. Several committees were also formed to implement or monitor various activities such as the quality system and safety in the laboratory.

# HUMAN RESOURCES





# Staff



The total number of staff in 2018 is 42 people

- |                 |                    |               |                          |                     |                  |
|-----------------|--------------------|---------------|--------------------------|---------------------|------------------|
| Top Management  | Research Fellow    | Post Doctoral | Administrative Officer   | Publication Officer | Research Officer |
| Science Officer | Assistant Engineer | Secretary     | Administrative Assistant | Operation Assistant | Driver           |

## Excellence Service Award 2018



Norizanne Abd Rahim



Norazli Sulaiman

## Staff Retired in 2018



Visanathan A/L Arumugam

# Committee

## Occupational Safety and Health Committee

### Chairman:

Assoc. Prof. Dr. Lim Hong Ngee

### Deputy Chairman:

Mr. Md Ali Rani

### Secretary:

Ms. Noor Lina Shamsuddin

### Employer Representatives:

Ms. Sarinawani Abdul Ghani

Ms. Roslina Abdul Rashid

Ms. Nurnazeera Zulkefli

Ms. Marzieana Ab Rahman

(Until June 2018)

Mr. Nazrul Abdullah

### Employee Representative:

Mr. Ab Haffiz Ab. Jalil

Mr. Mohd Wafi Azimin

Mohammad Jan

Mr. Mohd Kadri Masaud

Mr. Zakky Yamanie

Jamiauddin

Ms. Zamzurina Abdul Wahab

### Chemical Waste Coordinator:

Mr. Mohd Kadri Masaud

### E-Waste Coordinator:

Mr. Mohd Wfi Azimin

Mohammad Jan

### Radiation Protection Officer (RPO):

Ms. Sarinawani Abdul Ghani

### Radiation Worker:

Mr. Mohd Kadri Masaud

## Quality Management System (QMS) MS 9001 Committee

### Timbalan Wakil Pengurusan:

Mr. Din Bin Ayup

### Timbalan Pegawai Kawalan Dokumen:

Mr. Ali Nong

### Timbalan Penyelaras Audit Dalam:

Ms. Norizanne Abd Rahim

### Timbalan Penyelaras Kepuasan Pelanggan:

Ms. Nursyahirah Amirah Mazlan

### Timbalan Penyelaras Latihan Staff :

Mr. Din Bin Ayup

### Lead Auditor:

Mr. Md Ali Rani

### Internal Auditors:

Ms. Rosiah Osman

Ms. Juraina Md Yusof

Ms. Roslina Abdul Rashid

Ms. Rokiah Deraman

Mr. Mohd Wafi Azimin

Muhammad Jan

Mr. Nazrul Abdullah

## Research Committee

### Director:

Assoc. Prof. Dr. Mohd Nizar Hamidon

### Chair Person:

Dr. Intan Helina Hasan

### Committee Members:

Dr. Ismayadi Ismail

Ms. Rosiah Osman

Ms. Juraina Md Yusof

Ms. Norizanne Abd Rahim

## Emergency Response Team (ERT)

### Commandant:

Assoc. Prof. Dr. Lim Hong Ngee

### Deputy Commandant:

Mr. Md Ali Rani

### Liason Officer:

Ms. Noor Lina Shamsuddin

### Planning:

Ms. Roslina Abdul Rashid

### Head of ERT Operation:

Mr. Ab Haffiz Ab. Jalil

### Logistic:

Ms. Sarinawani Abdul Ghani

### Finance:

Mr. Din Ayup

### First Aiders:

Ms. Zamzurina Abdul Wahab

Mr. Abd Hakim Abdullah

### Fire Fighting Officer:

Mr. Mohd Kadri Masaud

### Evacuation Team:

Mr. Mohd Wafi Azimin

Mohammad Jan

Mr. Nazrul Abdullah

Mr. Zakky Yamanie

Jamiauddin

Ms. Nurnazeera Zulkefli

Mr. Muhamad Zuhairi Zainul Abidin

### Calibration and Verification Committee 2018

**Chairman:**

Ms. Roslina Abdul Rashid

**Secretary:**

Ms. Noor Lina Shamsuddin

**Committee Members:**

Mr. Nazrul Abdullah  
Mr. Ab Haffiz Ab Jalil  
Mr. Mohd Wafi Azimin  
Mohammad Jan  
Mr. Mohd Kadri Masaud  
Mr. Zakky Yamanie Jamiauddin

### Quality Management System (QMS) MS ISO/IEC 17025 Committee

**Quality Manager:**

Ms. Sarinawani Abdul Ghani

**Deputy Quality Manager:**

Ms. Roslina Abdul Rashid

**Technical Manager:**

Dr. Ismayadi Ismail

**Deputy Technical Manager:**

Mr. Md Ali Rani

**Document Control Officer:**

Mr. Mohd Ali Mat Nong

**Member:**

Ms. Nurnazeera Zulkefli

### Industry and Community Linkages Committee

**Deputy Director:**

Assoc. Prof. Dr Abdul Halim Abdullah

**Chairman JIMN:**

Ms. Rosiah Osman

**Secretariat ICRIS:**

Ms. Nursyahirah Amirah Mazlan

**Committee Members:**

Ms. Roslina Abdul Rashid  
Dr. Idza Riati Ibrahim  
Dr. Intan Helina Hassan

### Technical and Quotations Meeting

**Chairman:**

Assoc. Prof Dr Suhaidi Shafie

**Secretary:**

Mr. Din Ayup

**Committee Members:**

Assoc. Prof. Dr. Abdul Halim Abdullah  
Assoc. Prof. Dr. Suraya Abdul Rashid  
Assoc. Prof. Dr. Lim Hong Ngee  
Ms. Sarinawani Abdul Ghani



Re-assessment of MS ISO/IEC 17025



Safety Talk and Activation Card Day for Postgraduates

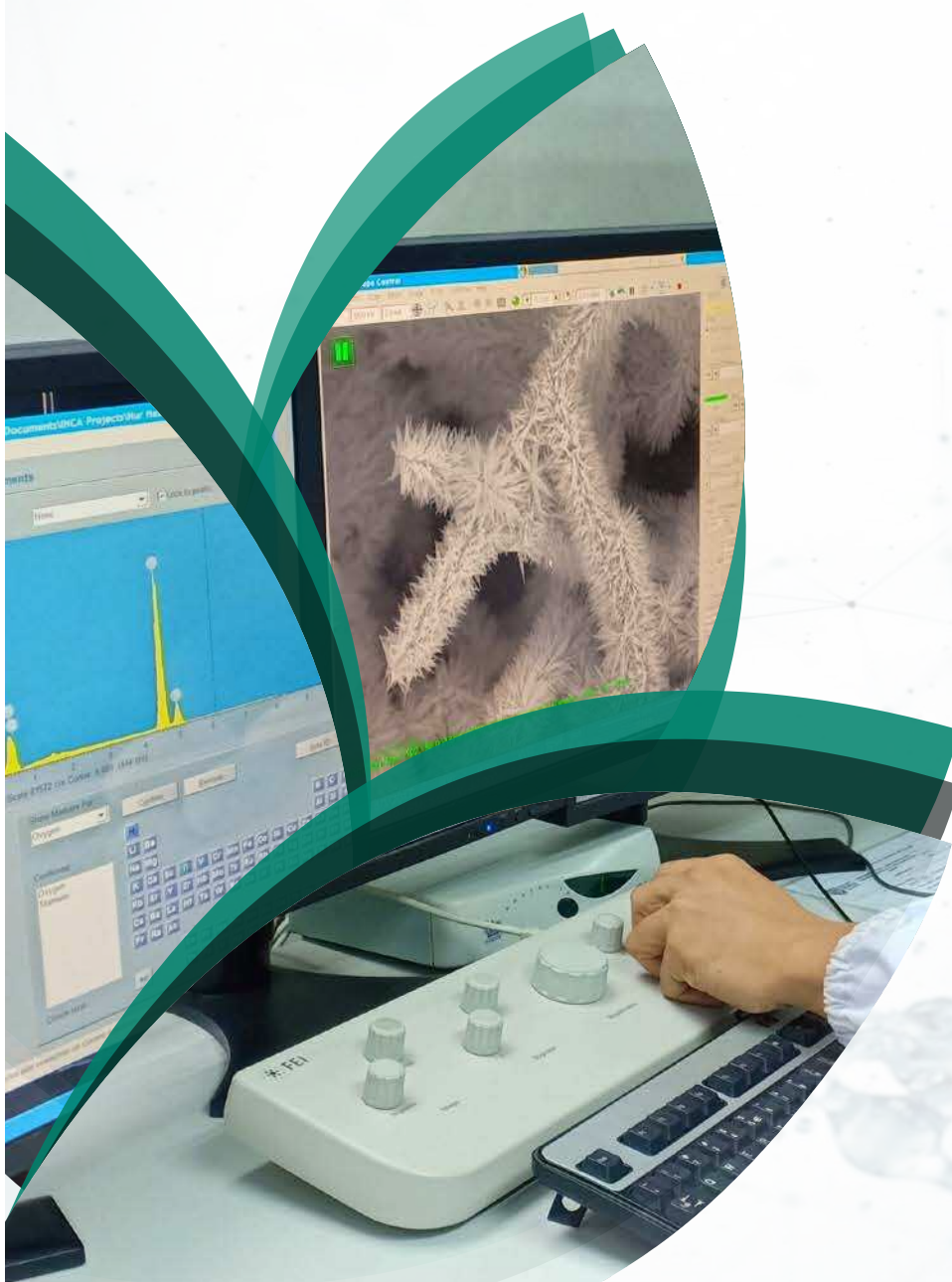


Fire Drill Training



ITMA provides testing services using a variety of equipment to meet the needs of research, especially in the areas of advanced materials and nanotechnology. One of ITMA's analytical laboratory services has been granted accreditation of MS ISO/IEC 17025.

# TESTING FACILITIES



# Testing Facilities

**Certificate of Accreditation by International Standard  
ISO/IEC 17025 : 2005**



## New Equipment:

### Rheometer



### Inkjet Deposition and Analysis System





ITMA organizes various activities each year to share and promote expertise in a variety of topics and fields. These activities also serve as a platform for meeting with experts to further develop the network with various stakeholders.

# ACTIVITIES REPORT





# Laboratory Activities

## Porous Silicon Workshop

**SERDANG, January 7** - Functional Devices Laboratory (FDL), Institute of Advanced Technology (ITMA) UPM has successfully organized a Porous Silicon Fabrication Workshop on 7th and 8th January 2018 at ITMA, UPM. A total number of 20 participants from various faculties and institutes from inside and outside UPM participated in this workshop.

This workshop was facilitated by Dr. Tevhit Karacali from Ataturk University, Erzurum Turkey. The first day of the workshop started with an introduction of Porous Silicon (PS). The interest on PS has increased because the high surface area of porous silicon is found to be useful as a model of the crystalline silicon surface in spectroscopic studies, as a precursor to generate thick oxide layers on silicon, and as a dielectric layer in capacitance based chemical sensors. The session continued with a hands-on demonstration on PS sample preparation and fabrication. FESEM characterization was done on the sample to verify the output.

This workshop was a success with participants gaining new knowledge on Porous Silicon technology. It is hoped that this workshop will inspire participants to diversify the use of PS into different applications in the future.

## Journal Writing Workshop 2018 by Functional Devices Laboratory (FDL)

**SERDANG, February 6 & 7** - A Journal writing workshop was organized by Functional Device Laboratory (FDL) at the Putra Wacana Room 2, TNCPI UPM Office.

This workshop was attended by 30 participants from various institutions in UPM including ITMA, Faculty of Engineering, Faculty of Science and INTROP. This workshop was conducted by Dr. Amir Reza Sadrolhosseini as a speaker and assisted by Dr Norhafiz Azis and Dr. Suhaidi Shafie as facilitators. Various guides have been given to participants to improve their writing skills so that the manuscripts can be published by high-impact journals.



# Laboratory Activities

## Workshop on Surface Area & Particle Size Distribution SAPSiD.2 2018

**SERDANG, February 8** - Institute of Advanced Technology (ITMA) has organized a Workshop on Surface Area & Particle Size Distribution SAPSiD.2 2018. This workshop aims to provide exposure on the basic concept of surface area and particle size distribution for porous and nonporous nanomaterials. A total of 40 participants from various faculties and institutes from within and outside UPM participated in this workshop.

The workshop session started with a theoretical session presented by Professor Dr. Mohd. Zobir Hussein, a Fellow researcher at ITMA. In the afternoon, demonstration sessions were held at ITMA labs. The demonstration session, were taken over by assistant engineers and ITMA student representatives. This program has been successfully organized and is expected to benefiting to researchers and graduate students who participate in the program.

## Journal Writing Workshop 2018 by Materials Synthesis and Characterization Laboratory (MSCL)

**SERDANG, July 25 & 26** - Materials Synthesis and Characterization Laboratory (MSCL), ITMA organized the Journal Writing Workshop 2018 at Academic Complex A, Universiti Putra Malaysia.

A total of 48 participants were involved in the workshop consisting of staff and students from Universiti Putra Malaysia. The invited speakers comprising of lecturers and post-doctoral had shared a lot of effective writing tips and techniques with the participants. This workshop was a platform for the experienced researchers to help and assist the young researchers in writing and publishing high impact journals.

This two-day workshop was conducted by experienced speakers with various topics such as Prof. Dr. Nor Azah Yusof (How to Publish a Review Manuscript), Dr. Syed Muhammad Hafiz Syed Mohd Jaafar (How to Publish in a High Impact Journal), Assoc. Prof. Dr. Suraya Abdul Rashid (How to Respond to Reviewers' Comments) and Dr. Ismayadi Ismail (Choosing the Right Journal for Early-career Researchers).





# Laboratory Activities



## International Symposium on Advanced Materials and Nanotechnology (i-SAMN2018)

**PUTRAJAYA, August 15** - The Institute of Advanced Technology (ITMA) successfully held the International Symposium on Advanced Materials and Nanotechnology (i-SAMN 2018); a platform for researchers to exchange views, finding and experiences on the current issues in the field of Advanced Materials and Nanotechnology. This two-day symposium was jointly organized with the Department of Chemical and Environmental Engineering, Faculty of Engineering, UPM and Malaysia Nanotechnology Association (MNA).

This symposium was officiated by Prof. Dato' Dr.-Ing. Ir. Renuganth Varatharajoo, Deputy Vice Chancellor (Industry and Community Relations) and took place at the Everly Putrajaya. With the theme "Gearing towards Renewable Energy and Environmental protection by Emerging Nanotechnologies", i-SAMN2018 has managed to gather over 60 participants together with local and international experts to share knowledge and results of their latest research. The presented papers will be peer-reviewed for publication of "SAMN2018 Special Issue" in the International Journal of Nanotechnology Inderscience Publishers.

Keynotes speeches of the symposium were presented by Prof. Endo Morinobu (Shinshu University, Japan) and Prof. Dr. Noorhana Yahya (Universiti Teknologi Petronas). Meanwhile the plenary sessions were presented by Prof. Shaobin Wang (Curtin University, Australia), Prof. Yousheng Tao (Haixi Institutes, Chinese Academy of Sciences (CAS), China), Prof. Abdul Rahman Mohamed (USM) and Prof. Ishak Ahmad (UKM).

The i-SAMN2018 Chairman, Assoc. Prof. Dr. Suraya Abdul Rashid expressed hope that the participants had a beneficial meeting and established their networking with one another for future collaboration in the field of Advanced Materials and Nanotechnology. She also hoped that the current collaboration and support from all parties will continue in future events.



# Laboratory Activities



## Thick Film Fabrication Workshop 2018 [TFFW2018]

**SERDANG, August 27** - Functional Devices Laboratory (FDL), Institute of Advanced Technology (ITMA) UPM has successfully organized the second series of "Thick Film Fabrication Workshop 2018 (TFFW2018)" at ITMA, UPM. This workshop was co-organized by IEEE Electron Devices Society (EDS) Malaysia Chapter, and Khai Lien Silk Screen Suppliers (M) Sdn. Bhd. A total of 10 participants from UPM, Universiti Teknologi Malaysia (UTM) dan Universiti Malaysia Pahang (UMP) participated in this workshop.

The first day of the workshop started with a talk on thick film technology applications by Assoc. Prof. Dr. Mohd Nizar Hamidon, Director of ITMA. Participants were briefed in detail on how thick films are prepared, the fundamental knowledge of thick film and the applications known as thick film technology. Later, the hands-on session was continued with demonstration on the thick film paste preparation in the laboratory.

Participants were introduced to the materials needed and the method used to prepare the thick film paste, fabrication process of thick film which utilizes screen printing method, and the firing process of the thick film. The afternoon session of the workshop was continued with a demonstration session of the frequency measurement of antenna which was fabricated using thick film technology, using Vector Network Analyzer or VNA by Dr. Intan Helina Hasan, a research officer in ITMA.



# Laboratory Activities



## Materials Characterization Seminar Raman Spectroscopy & Ftir (Machas 1.0)

**SERDANG, October 24 to 25** - Institute of Advanced Technology (ITMA), UPM successfully organized "Materials Characterization Seminar: Raman Spectroscopy & FTIR". The first series of this seminar was held at the ITMA Seminar Hall and attended by 22 participants comprising of students and researchers from UPM, other public universities and industry. MaChas 1.0 is program for young researchers and students to learn more about the materials characterization techniques

The speakers on the first day consisted of Dr. Rozan Mohamad Yunus (Universiti Kebangsaan Malaysia), Dr. Syed Muhammad Hafiz Syed Mohd Jaafar (ITMA) and Dr. Nizam Tamchek (Faculty of Science, UPM). The talks were about the characterization of metal oxide as well as carbon-based and amorphous crystalline-silicon based materials using Raman Spectroscopy. In addition, there was also a Raman Spectroscopy data analysis session using Origin Pro software.

The topics on day two focused on the introduction and theory of materials characterization using Fourier Transform Infrared (FTIR). The talk was conducted by Dr. Amir Reza Sadrolhosseini, ITMA research fellow. He also conducted a session for data analysis using IRPal 2.0 software and FTIR demonstration in the ITMA Analysis Laboratory.





# 2018 Pictorial

Farewell for Visanathan

22 February 2018



Farewell for Mohd Shamsul Ezzad

29 March 2018



Family Day  
21 - 22 April 2018





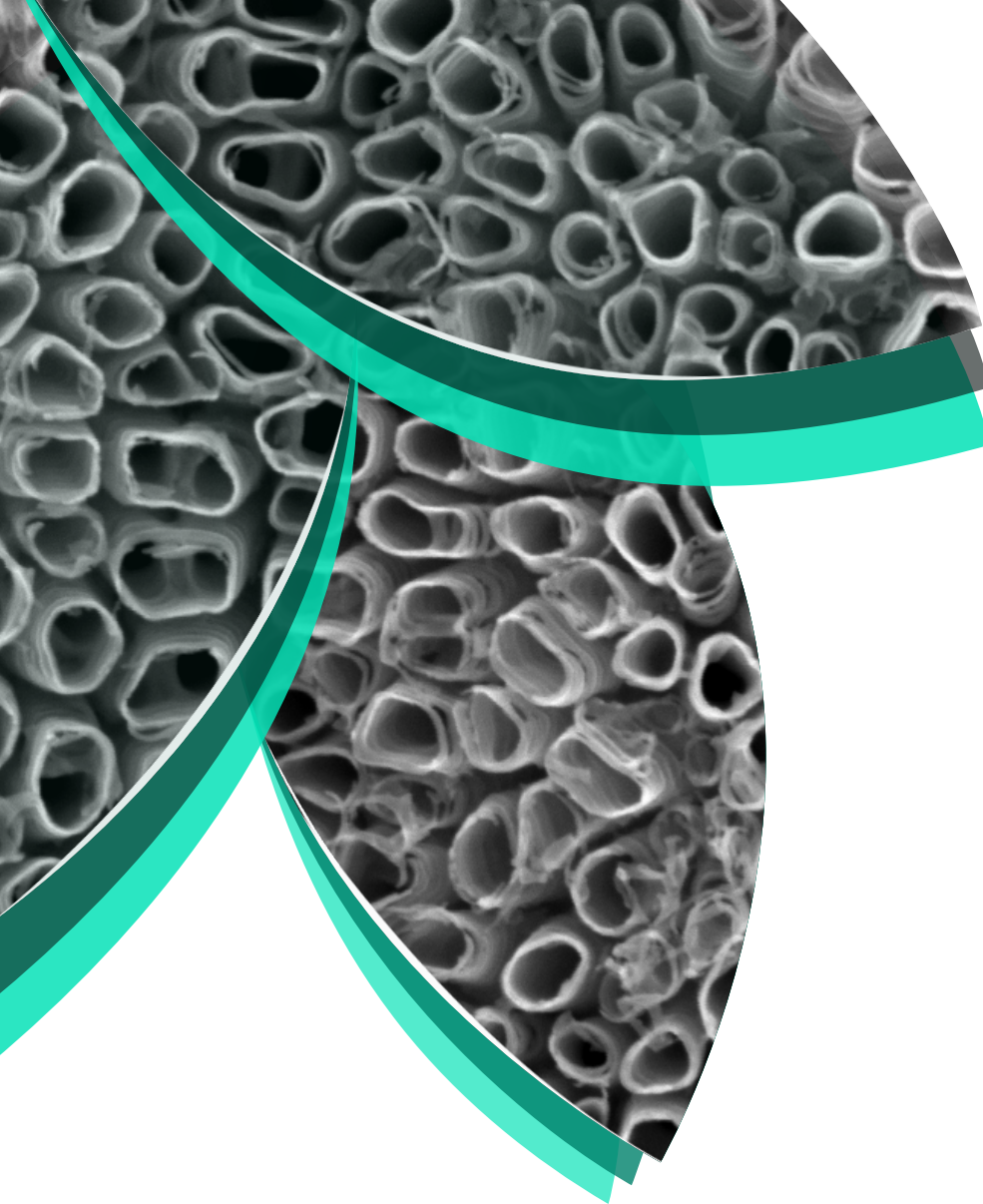


ITMA Eid Celebration  
3 July 2018

#### Club & Staff Tours



Majlis Tahlil  
7 September 2018



## FURTHER INFORMATION

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