Universiti Kebangsaan Malaysia
The National University of Malaysia

imen

INSTITUTE OF
MICROENGINEERING AND
NANOELECTRONICS

IMEN

"lets think big by thinking small"

www.ukm.my/imen
imen@ukm.edu.my
facebook/imen

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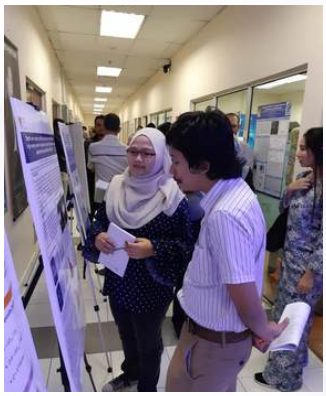


Prof. Ir. Dr Ahmad Ashrif A Bakar

Director

"Our aspiration is to propel Malaysia's technological frontier through pioneering ideas and cutting-edge technologies. Fuelled by the latest support from RMK, we are now establishing the advanced Malaysian Nanofabrication Center, a state-of-the-art research facility dedicated to pushing the boundaries of nanofabrication. This center will serve as a cornerstone for a diverse spectrum of advanced technology sectors, with a particular emphasis on empowering the semiconductor industry through groundbreaking research and technology. This endeavor is a vital catalyst for Malaysia's economic transformation, solidifying our nation's position as a prominent leader in advanced manufacturing on the global stage.

Heartfelt gratitude to all IMEN researchers, our esteemed graduates, and the unwavering support of UKM. Their collective dedication is the driving force behind our unwavering mission to establish IMEN as a world-renowned institute for microengineering and nanoelectronics research."

VISION & MISSION

01 VISION

To be a world class institute for research and innovation in microengineering and nanoelectronics

02 MISSION

To champion microengineering and nanoelectronics research towards innovative solutions for a better future

BACKGROUND

IMEN's roots trace back to 1988, with early microelectronics research at the Department of Electrical, Electronic and Systems Engineering, and organic electronics studies in the Department of Physics from 1987. Key developments included a crucial furnace donation in 1992 and Telekom Malaysia's recognition and funding in 1993, which led to the UKM-Telekom Microfabrication Laboratory. This evolved into the UKM-TM Microelectronics Research Centre (MERC) in 1997, featuring Malaysia's first Class 1000 cleanroom and comprehensive semiconductor microfabrication facilities. Finally, in 2002, IMEN was established as an independent institute, consolidating research across six key themes, solidifying its role as a leader in microengineering and nanoelectronics.

TOP MANAGEMENT OF INSTITUTE

SENIOR ASSISTANT REGISTRAR
SITI AZURA ABD RAHIM

DIRECTOR
PROF. IR. DR. AHMAD ASHRIF A BAKAR

DEPUTY DIRECTOR
ASSOC. PROF. DR. MUHAMAD RAMDZAN BUYONG

HEAD OF QUALITY ASSURANCE
DR. ABDUL RAHMAN MOHMAD

HEAD OF
MEMS/NEMS
PROF. DR. JUMRIL YUNAS

HEAD OF
NQE
DR. DILLA DURYHA BERHANUDDIN

HEAD OF
OHFEL
DR. TENGKU HASNAN TENGKU ABD AZIZ

HEAD OF
MIPAC
DR. MARIA ABU BAKAR

HEAD OF
MINES
PROF. DR. MASURI OTHMAN

HEAD OF
RESEARCH
ASSOC. PROF. TS. DR. P. SUSTHITHA MENON

MANAGER
RESEARCH LAB
DR. RHONIRA LATIF

56
TOTAL STAFF

11 Professor
36 Academics
21 Non-academics

85
TOTAL STUDENT (ONGOING)

46 PhD.
39 MSc.
16 Ongoing International Students

170 Total Alumni

LABORATORIES

IMEN provides 13 laboratories, each dedicated to supporting specific aspects of our research in microengineering and nanoelectronics. Key facilities include:

CLEANROOM

ELECTRONICS PACKAGING

C-ELECRONICS

THIN FILMS

and more...

AWARDS & RANKINGS

KEMENTERIAN SAINS, TEKNOLOGI DAN INOVASI — imen

NanoCOE

NANOMALAYSIA CENTER OF EXCELLENCE (2011)

KEMENTERIAN PENDIDIKAN TINGGI — imen

HiCOE

MEMS FOR BIOMEDICAL (2014)

#126 QS WORLD UNIVERSITY RANKINGS 2026 — IN THE TOP 150 IN THE WORLD

#24 QS ASIA UNIVERSITY RANKINGS — QS UNIVERSITY RANKINGS ASIA TOP 30 2026

#208 QS WORLD UNIVERSITY RANKINGS SUSTAINABILITY — RANKED 2026

5 — QS STARS University Ratings — Overall Teaching Employability Internationalization Facilities

#301 -350 THE WORLD UNIVERSITY RANKINGS — THE World University Rankings 2026

#103 THE ASIA UNIVERSITY RANKINGS — THE World University Rankings Asia 2025

#53 Times Higher Education Impact Rankings

HURS — Awarded 5 Stars+ Rating — Healthy University Rating System

#1 MALAYSIA — AppliedHE Public & Private University Ranking

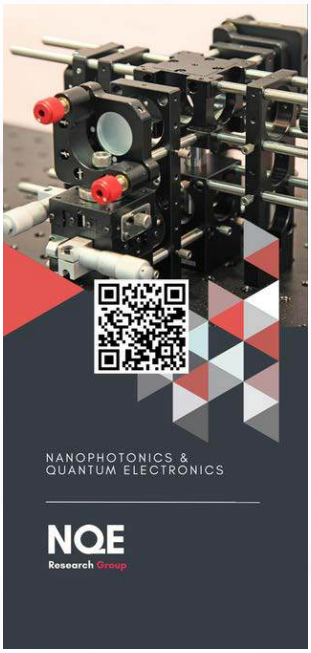
PROGRAMS

PhD

Doctor of Philosophy

MSc

Master of Science
in
Microengineering & Nanoelectronics



MEMS

nano photonics
quantum electronics

Organic Hybrid
Flexible Electronics

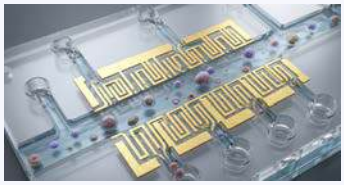
Microelectronics
Packaging & Materials

Micro &
Nanoelectronics
System

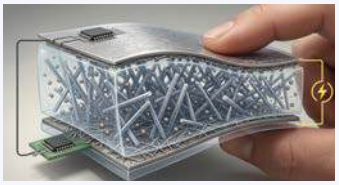
RESEARCH TOPICS

Advance your academic career with us. These focused research topics/area are available for MSc and PhD studies at IMEN.

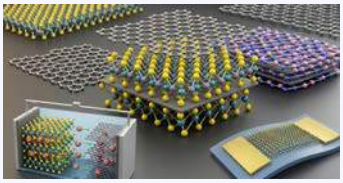
- Dielectrophoresis Microfluidics Chips for Micro/NanoBio Application
- Polymer based MEMS and nanogenerator
- 2-Dimensional materials for energy and electronics applications
- Metal oxide (TiO2 and ZnO) nanorods photocatalyst and biosensors
- Plasma modification and sintered silver for MEMS applications
- Low-dimensional materials and nanodevices for strain-pressure gas Sensor, and biosensor applications
- Biomedical devices for artificial Kidney applications
- Acoustic based actuator and sensor
- Thermal management of FET power devices
- Microfluidic devices for drug delivery (Micropumps, Micromixer and Microneedle)
- Development of GaN Power device



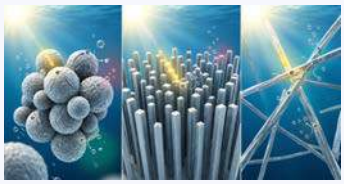
Dielectrophoresis Microfluidics Chips for Micro/NanoBio Applications



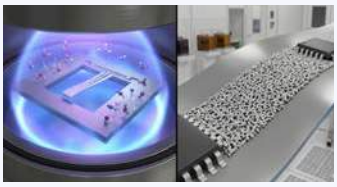
Polymer-based MEMS and nanogenerator



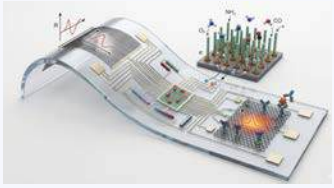
2-Dimensional materials for energy and electronics applications



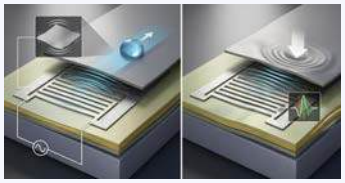
Metal oxide (TiO2 and ZnO) nanorods photocatalyst and biosensors



Plasma modification and sintered silver for MEMS applications.



Low-dimensional materials and nanodevices for strain-pressure sensor, gas Sensor, and biosensor applications



Acoustic based actuator and sensor

RESEARCH TOPICS

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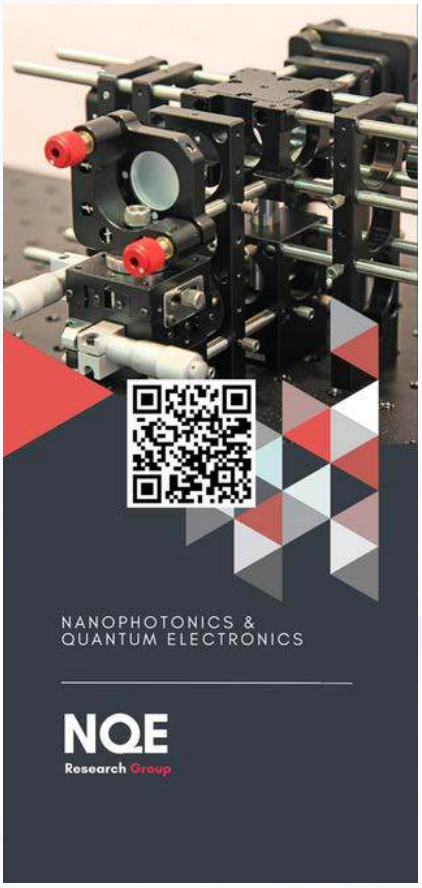
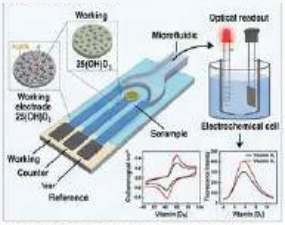
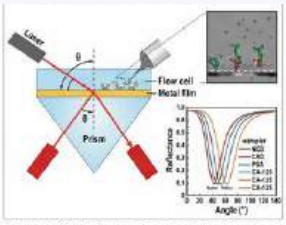


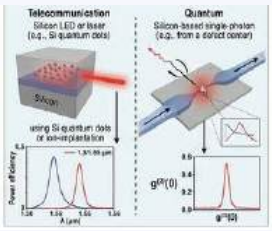
- Efficient optoelectronics devices for silicon photonics application
- Photonic crystal based nanosensor
- Optical Fiber-Based Sensor Technology (Sensors and Lasers)
- 3D printing and micro machining processes for optical devices
- Development of sensing materials for optical sensor applications
- Krestchmann-based angular interrogation Bionavis SPR biosensing for detection of NCD, CKD and ovarian cancer biomarkers
- Opto-electrochemical biosensing of Vitamin D3 deficiency using screen printed carbon electrodes
- Development of Silicon Vacancy nanodiamond Quantum sources using inkjet printing
- Developement of SiGe and 2D-based photodetectors
- Efficient silicon based light emitter for telecommunication and quantum application



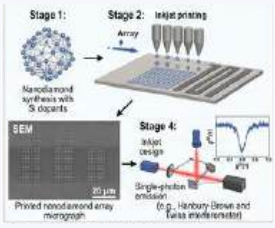
Opto - electrochemical biosensing of Vitamin D3 - screen printed carbon electrodes



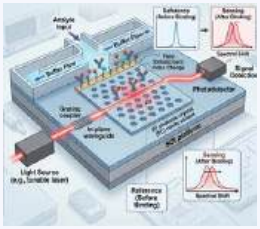
SPR biosensing for detection of NCD, CKD and ovarian cancer biomarkers



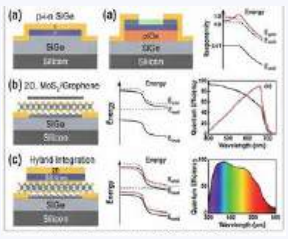
Silicon based light emitter for telecommunication and quantum application



Silicon Vacancy nanodiamond Quantum sources using inkjet printing

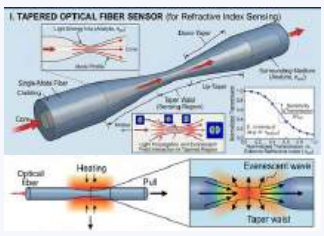


Photonic crystal based nanosensor

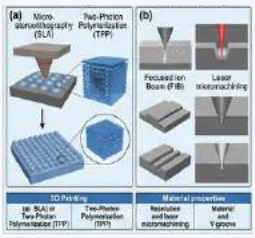


SiGe and 2D-based photodetectors

Sensing materials for optical sensor applications



Sensing materials for optical sensor applications



3D printing and micro machining processes for optical devices

RESEARCH AREA

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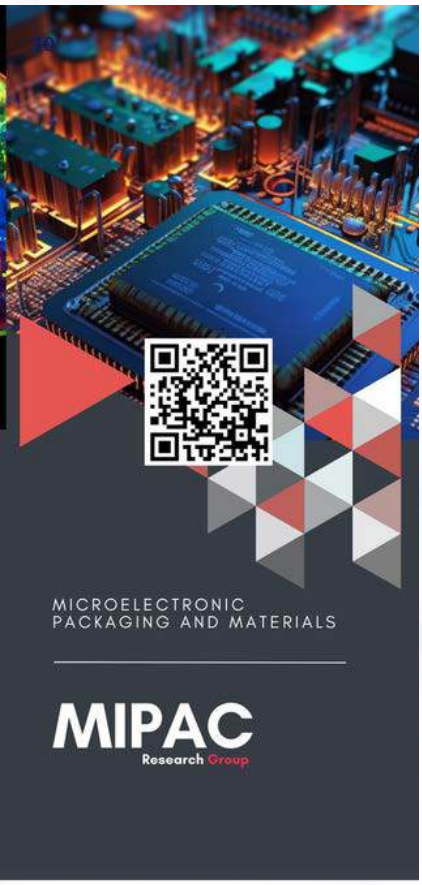
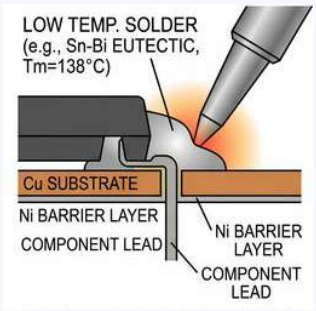
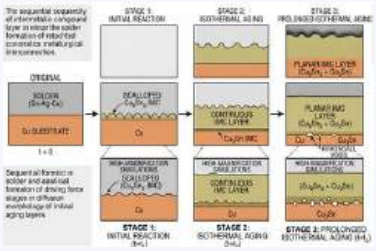


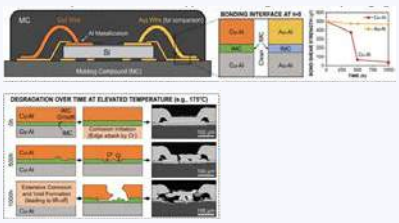
- Solder and soldering
- Structure-properties-performance of semiconductor packaging
- Surface mount technology
- Electronics assembly and testing
- Package reliability
- Metrology and stereometry
- Thermal management for electronics
- Thermal interface materials
- Sinter and sintering technology



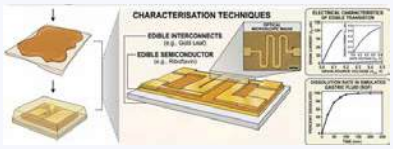
solder and soldering



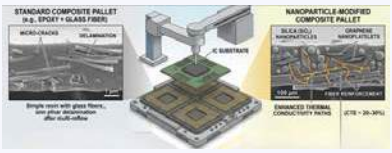
Structure-properties-performance of semiconductor packaging



Elevated temperature corrosion of copper wire bonding in electronics packaging



Fabrication and characterisation of edible electronics

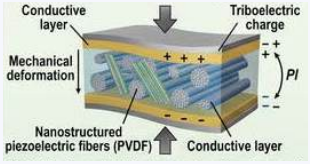


Nanoparticle structural composite modification of IC substrate pallet for thermal multi reflow process

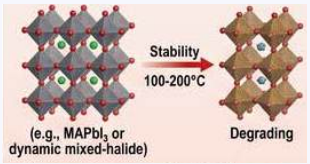
RESEARCH TOPICS

Advance your academic career with us. These focused research topics/area are available for MSc and PhD studies at IMEN.

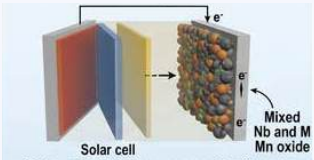
- Hybrid piezoelectric nano-structured organic polymers for triboelectric energy harvesting.
- Heat resistant perovskite halide system.
- Niobium-manganase composite films as counter electrode for dye-sensitized solar cell
- Molybdenum trioxide-titanium dioxide as photoanode for dye-sensitized solar cell
- Molecularly Imprinted Polymer-based Sensor for Early Detection of Chronic Kidney Disease
- Plasmonic ZnO Catalyst for Enhanced CO2 Reduction
- Two-dimensional titanium carbide (Mxene)/silver nanostars (AgNs) composite as SERS substrate for thiram pesticide detection
- Building localized surface plasmon resonance sensor as biosensor
- Fabrication of carbon-based composite as thermally conductive materials
- A simulation study of thermal materials for efficient heat transfer in integrated circuit
- Improvement of Organic Transistor Performance by utilizing Blended Structure



Hybrid piezoelectric nano-structured organic polymers for triboelectric energy harvesting.

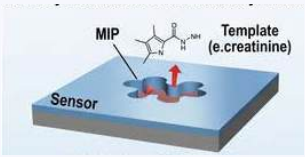


Heat resistant perovskite halide system.



Niobium-manganase composite films as counter electrode for dye-sensitized solar cell

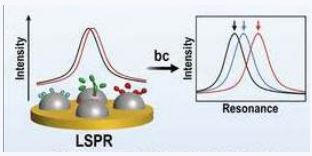
Molybdenum trioxide-titanium dioxide as photoanode for dye-sensitized solar cell



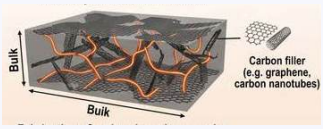
Molecularly Imprinted Polymer-based Sensor for Early Detection of Chronic Kidney Disease

Plasmonic ZnO Catalyst for Enhanced CO2 Reduction

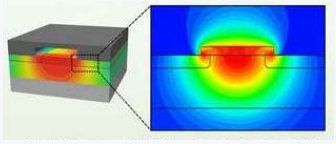
Two-dimensional titanium carbide (Mxene)/silver nanostars (AgNs) composite as SERS substrate for thiram pesticide detection



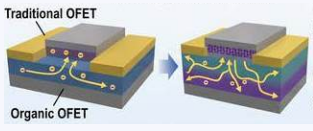
Building localized surface plasmon resonance sensor as biosensor



Fabrication of carbon-based composite as thermally conductive materials



A simulation study of thermal materials for efficient heat transfer in integrated circuit

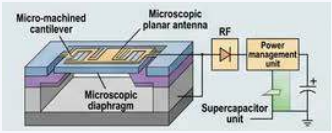


Improvement of Organic Transistor Performance by utilizing Blended Structure

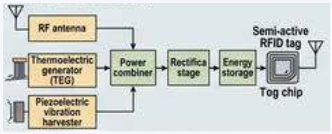
RESEARCH TOPICS

Advance your academic career with us. These focused research topics/area are available for MSc and PhD studies at IMEN.

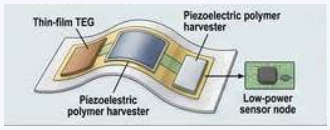
- Development of MEMS based antenna RF micro energy harvester for wireless sensor network.
- Design of micro energy harvester using hybrid input radio frequency, thermal and vibration for semi active RFID tag.
- Development of low power hybrid energy harvester using thermal and solar for portable electronics devices.
- Designing ultra-low voltage low power current conveyer analog blocks.
- Design of mixed mode multifunction filters and quadrature oscillators employing novel current mode active element.
- RF transceiver of biomedical monitoring device for internet of thing applications.
- A low power hybrid micro energy harvesting circuit using thermal energy and vibration for biomedical devices.
- Design an architecture of ultra-low power micro energy harvester using rf signal for health care monitoring system.
- Implementation of smart card design base on ARM processor on FPGA system on chip Biosensors Interface Controller for Healthcare Monitoring System Using IoT.
- Biosensors Interface Controller for Healthcare Monitoring System Using IoT.
- Design and Development of an Integrated System for Intelligent Sensing, Biomedical, and Internet-of-Things (IoT) Applications.
- FPGA design for Object Detection, Tracking, and Smart Systems.
- Analog and Digital Integrated Circuit Design.



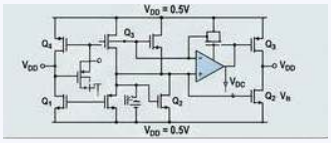
Development of MEMS based antenna RF micro energy harvester for wireless sensor network.



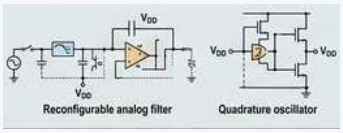
Design of micro energy harvester using hybrid input radio frequency, thermal and vibration for semi active RFID tag



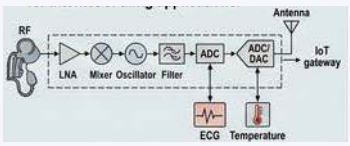
Low power hybrid energy harvester using thermal and solar for portable electronics devices.



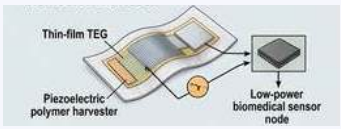
ultra-low voltage low power current conveyer analog blocks



Design of mixed mode multifunction filters and quadrature oscillators employing novel current mode active element.

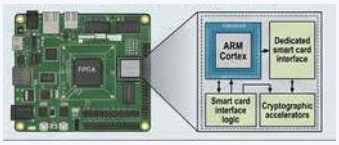


RF transceiver of biomedical monitoring device for internet of thing applications.

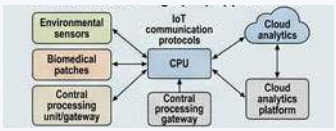


A low power hybrid micro energy harvesting circuit using thermal energy and vibration for biomedical devices.

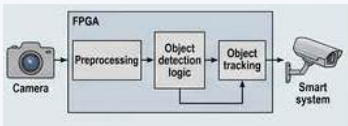
Design an architecture of ultra-low power micro energy harvester using rf signal for health care monitoring system.



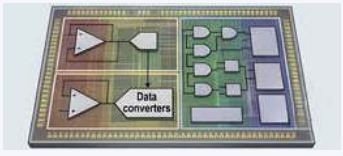
Smart card design base on ARM processor on FPGA system on chip Biosensors Interface Controller for Healthcare Monitoring System Using IoT.



Design and Development of an Integrated System for Intelligent Sensing, Biomedical, and Internet-of-Things (IoT) Applications.



FPGA design for Object Detection, Tracking, and Smart Systems.



Analog and Digital Integrated Circuit Design.

44
ongoing funded project

RM 10.63 j
Research Fund / Grants (2024)

548
High Impact Publication (2012 -2024)

24
Patent

26, 563
Citation

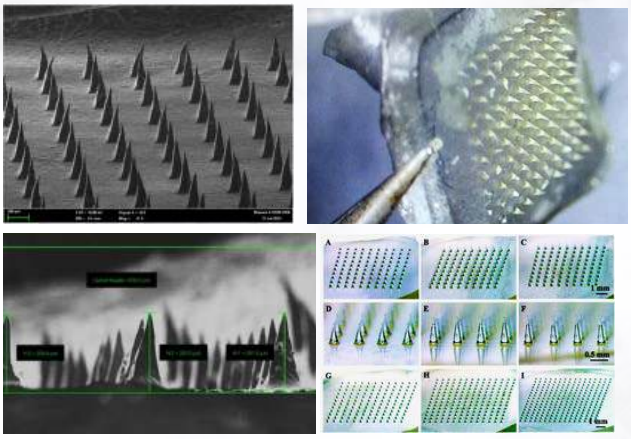
RESEARCH HIGHLIGHTS

PeritoCare®

Portable and Wearable Tidal Peritoneal Dialysis System

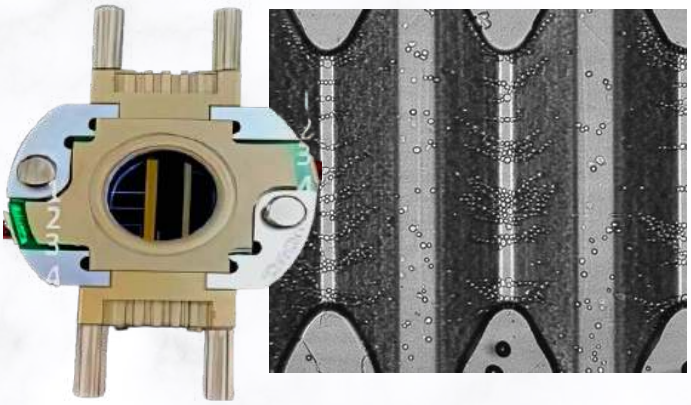
CKD sensor non-invasive for chronic kidney disease

MICROneedle



Maltose-Based Microneedle Patch To Enhance Topical Anaesthetic

DEP dielectrophoresis



The biomedical uses of DEP in liquid biopsies, stem cell-based therapies, and diagnosis of infectious diseases due to bacteria and viruses are presented

and more...

NETWORK.

Part of active local and international network

and more...

IMEN OUTREACH PROGRAM

•500 Participants from all over Malaysia
•Fully sponsored (RM 33, 528) by NNC MOSTI, Malaysia
•14-17 September 2022
•Online Platform conjunction with Minggu Sains Negara

•promotes school students' interest in electrical & engineering and nanoelectronics
•Fun Experiment/Theory Activities

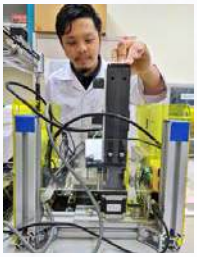
IJEN
IMEN JUNIOR ELECTRONICS & NANOTECHNOLOGY

•Kem Eksplorasi Sains dan Teknologi IMEN –AT&S Sponsored by AT&S Malaysia
•Participated by 160 pupils from eight primary schools from District of Kuala Muda/Yan Kedah

IMEN JUNIOR ELECTRONICS & NANOTECHNOLOGY CAMP

GALLERY



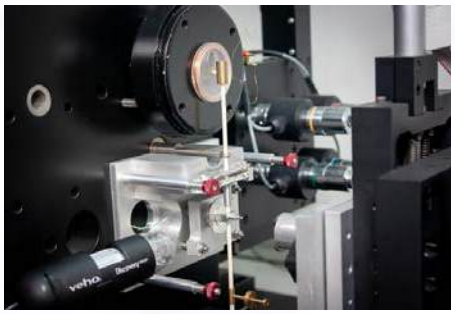



Microelectronics
Research Centre



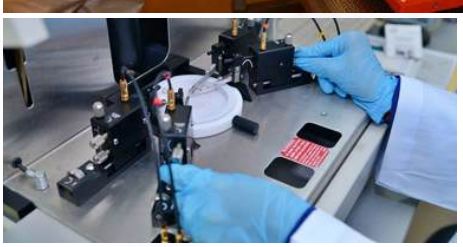
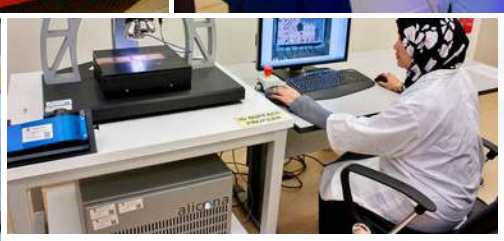






veho


MASK
ALIGNER

IMEN PROFESSOR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