Universiti Kebangsaan Malaysia
The National University of Malaysia

Naratif Baharu UKM
UNIVERSITI ATAN KITA

SELFUEL
Universiti Kebangsaan Malaysia

Hydrogen and Fuel Cells Week

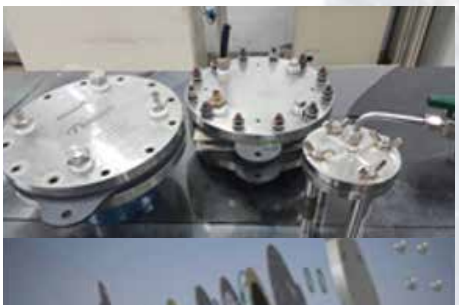
Come join us on:

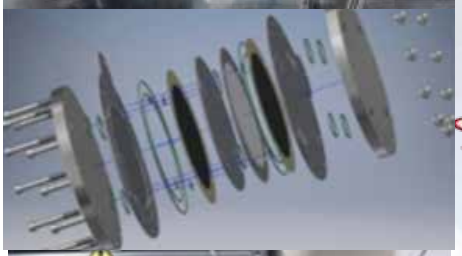
Date:
15 - 19th August 2022

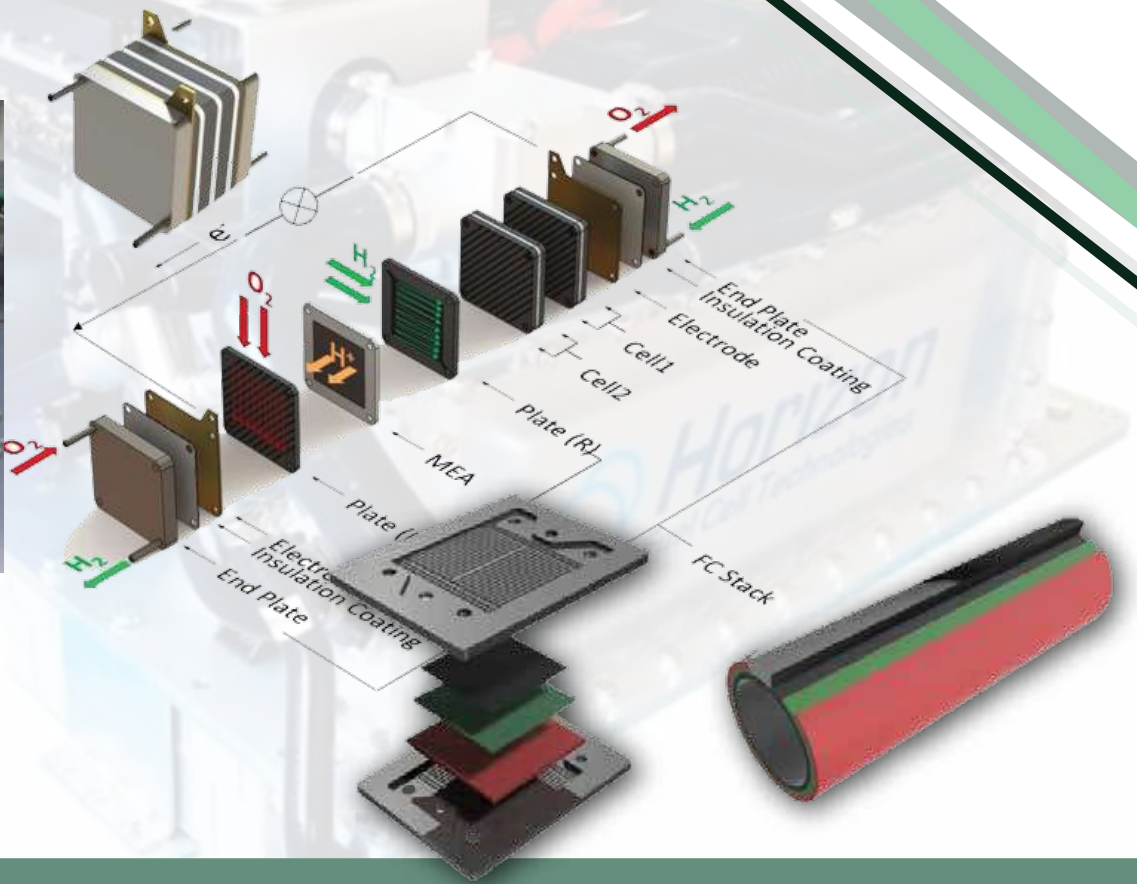
Venue:
Hybrid

TOPICS HIGHLIGHT:

- Basic Training on DFT Calculations with Quantum ESPRESSO
- Introduction to Computational Fluid Dynamics
- Polymer Electrolyte Membrane Fuel Cell and Electrolyzer Technologies
- Solid Oxide Fuel Cell Technologies
- Lab Demonstrations







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Scan for registration

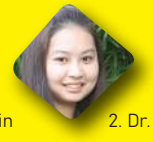
Registration link - **https://forms.gle/D8gnrRvVzGi4Akzv8**

Fee

Package	Courses	Registration Fee (RM)	
		Non-Industry	Industry
1	A: Molecular Modelling OR; B: Computational Fluid Dynamics	500 (EB) 600 (N)	900 (EB) 1,000 (N)
2	C: Polymer Electrolyte Membrane Fuel Cell and Electrolyzer OR; D: Solid Oxide Fuel Cell	350 (EB) 400 (N)	600 (EB) 700 (N)
3	Course C and Lab Demo OR; Course D and Lab Demo	900 (EB) 1,000 (N)	1,300 (EB) 1,500 (N)
1+2+ Lab Demo (Only for Industry)	(A or B) and (C or D) and respective Lab Demos	Not Applicable	2,200 (EB) 2,500 (N)

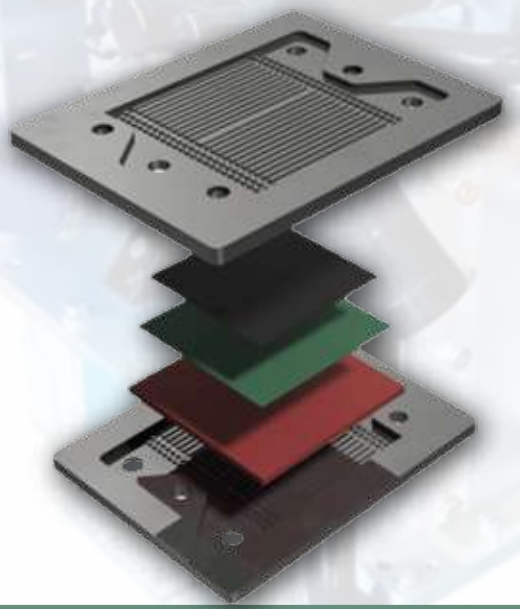
Note: EB - Early Bird (15th June 2022), N - Normal Rate

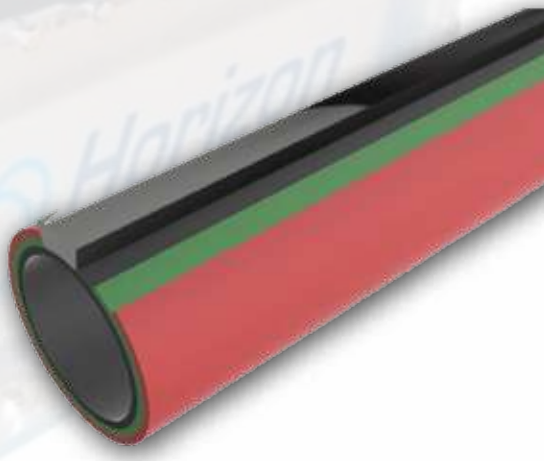
Course Introduction

Title	Basic Training on DFT Calculations with Quantum ESPRESSO: A Tool of Advance Research Material Development
Speaker	 1. Dr. Khuzaimah Arifin  2. Dr. Wong Wai Yin  3. Dr. Nabila A.Karim
Content Summary/ Introduction	Computational chemistry is a branch of chemistry that uses computer programs to solve equations of theoretical chemistry which encapsulate the behavior of a matter. It can be used to explain or predict chemical phenomena and properties of molecules, gases, liquids and solids at the atomistic level. The methods and capability of the calculation continue to improve from time to time in line with the advancement of computer hardware. Through computational chemistry, molecules can modeled prior to synthesizing work in lab. It can optimize research duration as well as chemical usage. This workshop aims to expose graduate students, postdoctoral, and researchers to use computational chemistry with Density Functional Theory (DFT) method as an effective research tool using Open-source software like Quantum ESPRESSO (QE). This two-day program providing a comprehensive overview of the most recent progress for developing advanced materials, about Quantum espresso: documentation and installation. Hands-on training will be provided to participants.
Objectives	Upon completion of the seminar, participants will able to: ▪ Understand about basic theoretical of computational chemistry ▪ Get ideas to conduct DFT calculation by using an open-source software
Who Should Attend?	Academicians Postgraduate students Post-doctorates Researchers from public and private industries Engineers

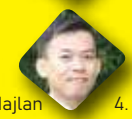
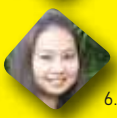
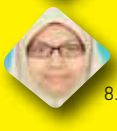
Course Introduction

Title	Introduction of Computational Fluid Dynamics
Speaker	 1. Assoc. Prof. Dr. Masli Irwan Rosli  2. Dr. Lim Bee Huah
Content Summary/ Introduction	Computational Fluid Dynamics (CFD) is one of the most used software in solving fluid dynamic, heat, and mass transfer analysis in academics and industry. The software uses the conservation of mass, momentum, and energy as the basic equations to predict the phenomena of the intended geometry. This course aims to introduce CFD and its basic applications to all participants. Then the course intends to demonstrate the CFD processes for fuel cell application by using the available commercial CFD software. The demonstration includes: 1. Sketching of geometry for Fuel Cell model. 2. Creating mesh by discretizing the model. 3. Solve the developed model by setting up the appropriate boundary conditions, material, and conservation equations. 4. Post-processing by generating the CFD simulation results.
Objectives	Upon completion of this course, participants will be able to: 1. Understand CFD suitability for different applications. 2. Plan CFD analysis for a fuel cell which includes geometry modeling, mesh generation, and boundary settings. 3. Compose the post-processing results using CFD software.
Who Should Attend?	Academicians Postgraduate students Post-doctorates Researchers from public and private industries Engineers

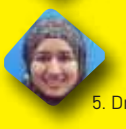




Course Introduction

Title	Current Technologies of Polymer Electrolyte Membrane Fuel Cell and Electrolyzer
Speaker	 1. Prof. Ir. Dr. Siti Kartom Kamarudin  2. Assoc. Prof. Dr. Mohd Shahbudin Mastar @ Masdar  3. Assoc. Prof. Dr. Edy Herianto Majlan  4. Assoc. Prof. Dr. Loh Kee Shyuan  5. Dr. T. Husaini  6. Dr. Wong Wai Yin  7. Dr. Azran Mohd Zainoodin  8. Dr. Norazuwana Shaari  9. Dr. Nabilah Afiqah Binti Mohd Radzuan
Content Summary/ Introduction	Electricity is one of the most crucial things to support our modern life. The issues surrounding fossil fuel as today's primary electricity source are that they will run out soon, and its combustion process is harmful to the environment. Fortunately, fuel cell technology and hydrogen energy may provide a solution. The use of fuel cells is diverse and stands to play a vital role as the world transitions to more sustainable technologies. Fuel cells with hydrogen gas as fuel able to generate electricity with pure water as the only by-product. It is a clean way to generate electricity. Besides that, hydrogen can be extracted from water molecule that is abundant on earth by electrolysis process. In future, we may be able to use fuel cells to generate electrical power for charging our everyday electrics and electronics. This course provides the principles and application of the System, electrode, membrane, bipolar plate for Polymer Electrolyte Membrane Fuel Cell, Electrolyser and Direct Methanol Fuel Cell. In addition, the lab demonstration by group course includes: ■ Membrane electrode assembly (MEA) preparation ■ Fuel cell assembly using prepared MEA ■ Catalyst ink preparation ■ Gas diffusion layer (GDL) painting equipment ■ Acquisition of half and full cell polarization curves ■ Fuel Cell Electrochemical Impedance Spectroscopy ■ Alkaline membrane, Nafion and other components. We hope to introduce to stakeholders especially academicians, researchers and students, and interested industries in Malaysia to participate in this course on fuel cells and hydrogen technology in the latest engineering, advanced materials, latest technology and renewable energy sources research.
Objectives	Upon completion of this course, participants will be able to: 1. Understand the basic principles related in the Polymer Electrolyte Membrane Fuel Cell, Electrolyser and Direct Methanol Fuel Cell. 2. Evaluate potential materials to be applied in the Polymer Electrolyte Membrane Fuel Cell, Electrolyser and Direct Methanol Fuel Cell. 3. Apply to the Polymer Electrolyte Membrane Fuel Cell, Electrolyser and Direct Methanol Fuel Cell.
Who Should Attend?	Academicians Postgraduate students Post-doctorates Researchers from public and private industries Engineers

Course Introduction

Title	Solid Oxide Fuel Cell Technologies
Speaker	 1. Prof. Dr. Andanastuti Muchtar  2. Assoc. Prof. Dr. Mahendra Rao Somalu  3. Dr. Nurul Akidah Baharuddin  4. Dr. Muhammed Ali  5. Dr. Nor Anisa Arifin
Content Summary/ Introduction	In today's world, highly efficient systems are required to fulfil the world's rising energy demand. One of the most promising solutions is the fuel cell. A fuel cell is an electrochemical device that produces energy in an efficient and environmentally friendly manner. Numerous industrialised countries regard the solid oxide fuel cell (SOFC) as a promising alternative energy source for the development of future sustainable energy systems in the near future. SOFCs, for example, are more fuel-compatible and less vulnerable to impurities than polymer electrolyte membrane fuel cells (PEMFC). This fuel tolerance is attributed to the high operating temperature. This enhances not just fuel combustion but also unwanted chemical reactions that may result in material degradation. As a consequence, development in SOFCs is mostly based on material research, and although significant progress has been made in recent decades, a number of technical challenges remain before SOFCs can be widely commercialised. This course will look at current developments in high-intermediate-low temperature solid oxide fuel cells. Numerous standard and innovative materials will be evaluated in terms of their characteristics and implications on SOFC component performance (electrolyte anode, cathode, interconnect, and sealing materials). Furthermore, developments in cell and stack design are discussed, as well as the challenges associated with their assembly and performance. This course also covers the fabrication procedures for the SOFC's various components (electrolyte anode, cathode, and interconnect). In addition, the fuel flexibility of the SOFC will be explored. This course also examines the performance of the SOFC with various electrolyte, anode, cathode, and fuel combinations. In addition, the lab demonstration by group course includes: ■ Fabrication of electrolyte and button cells. ■ Testing of electrolyte cells for ionic conductivity measurements. ■ Testing of button cells using electrochemical impedance spectroscopy (EIS) technique. ■ Acquisition and analysis of current (I)-Voltage (V) and current (I)-Power Density (P) curves using button cells at high operating temperatures. We hope to invite stakeholders in Malaysia, particularly academicians, researchers, and students, as well as interested industries, to participate in this course on fuel cells and hydrogen technology in the latest engineering, advanced materials, cutting-edge technology, and renewable energy source research.
Objectives	Upon completion of this course, participants will be able to: 1. Understand the fundamental concepts behind solid oxide fuel cells. 2. Evaluate potential materials for use in solid oxide fuel cells. 3. Application of solid oxide fuel cells under different fuel environment.
Who Should Attend?	Academicians Postgraduate students Post-doctorates Researchers from public and private industries Engineers

Payment Method

Payment to:

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Bank Account Name	: Universiti Kebangsaan Malaysia
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Notes:
Please specify "Hydrogen & Fuel Cells Week" in the payment detail. E.g.: HFCW-Ramli.
Registration is confirmed upon received payment.
The registration fee is non-refundable.

For further information:

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