

QUADRUPLE HELIX MODEL FOR INDUSTRIAL MATHEMATICS INFRASTRUCTURES IN MALAYSIA

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Outline of Presentation

- Abstract
- Features
- Quadruple Helix Innovation Model
- Our "Construction & Analysis of Models"
- Our Dedicated Research Centres/ UTM-CIAM
- Our Dedicated Business Arm/ MYHIMS Solutions LLP
- Conclusion

Our Prime Movers

- Emeritus Prof. Dr John Ockendon FRS, Oxford University, UK.
- Emeritus Prof. Dr Graeme Wake FRSNZ, Massey University, NZ.



Our Support Group

APMCfl founding members (Kyushu Univ, CSIRO, ANU, Massey, UTM)



Our Support Group

(OCIAM, Oxford University)



Our Active Promoter

Distinguished Prof. Dr Masato Wakayama, Kyushu University, Japan.



Abstract

- In Malaysia, collaborations with industry and external parties in the realm of industrial mathematics (IM) bring benefits to applications of R&D/knowledge & innovations in industry and community at large, opportunities for talent and capacity development in academic circle & government agency and access to funding from government & industry.
- Applying a Quadruple Helix (QH) innovation model/framework characterises the cooperation between the four main clusters (government, industry, academia & community user/civil society) involving interaction in the forms of relation, mobility, transfer and formality to produce innovations.
- This talk will present our current framework to facilitate the workings of our national innovative industrial mathematics (IM) infrastructures.

Features

- ➤In recent years, university-industry linkages in Malaysia have become enlarged given the rapid pace in knowledge & innovation generation as well as the escalating costs associated with R & D activities.
- ➤Our IM collaborations with industry and other external parties (academia, government & civil society/users) bring various benefits such as STEM (Science, Technology, Engineering & Mathematics) teaching and skills development; access to funding and empirical data from government & industry; application of knowledge & innovation; opportunities for talent development by both students and staff; and promotion of entrepreneurship and innovations.
- Concurrently with the Malaysian government initiatives in promoting linkages and knowledge transfer, our efforts in creating IM partnerships and collaborations with the four clusters need to be streamlined and enhanced.

Features

- In order to strengthen these IM linkages, we plan to embrace the "Quadruple Helix (QH) innovation model", which refers to a model or framework describing the interaction or innovation cooperation between the four clusters, namely government, industry, academia & community user/civil society.
- A general definition of the QH innovation model refers to an innovation cooperation model or innovation environment in which users, private firms, universities and public authorities cooperate in order to produce innovations.
- These innovations can be anything that is considered useful for the partners in innovation cooperation, for example, technological, social, product, service, commercial, non-commercial, private-sector and public-sector innovations.

Features

- Applying this QH innovation model implies that our IM linkage between the four clusters would involve interaction in the forms of relation (involving contract research, consultancy, etc.), mobility (involving research training, modelling workshop, study group, etc.), transfer (involving copyright, patent, commercialization, etc.) and formality (involving MOU, MOA, LOI, etc.).
- This framework has been used to describe the inner workings of regional innovation systems. (refer e.g. R. Arnkil, et. al., Exploring Quadruple Helix Outlining user-oriented (2010))
- This description suits well with our IM action plan and roadmap in strengthening, sustaining and identifying further interactive partnerships with the Malaysian industries, public authorities, universities and citizenry/community.

Quadruple Helix Innovation Model

https://realkm.com/2018/10/11/applying-the-quadruple-helix-model-of-open-innovation-in-knowledge-based-development/



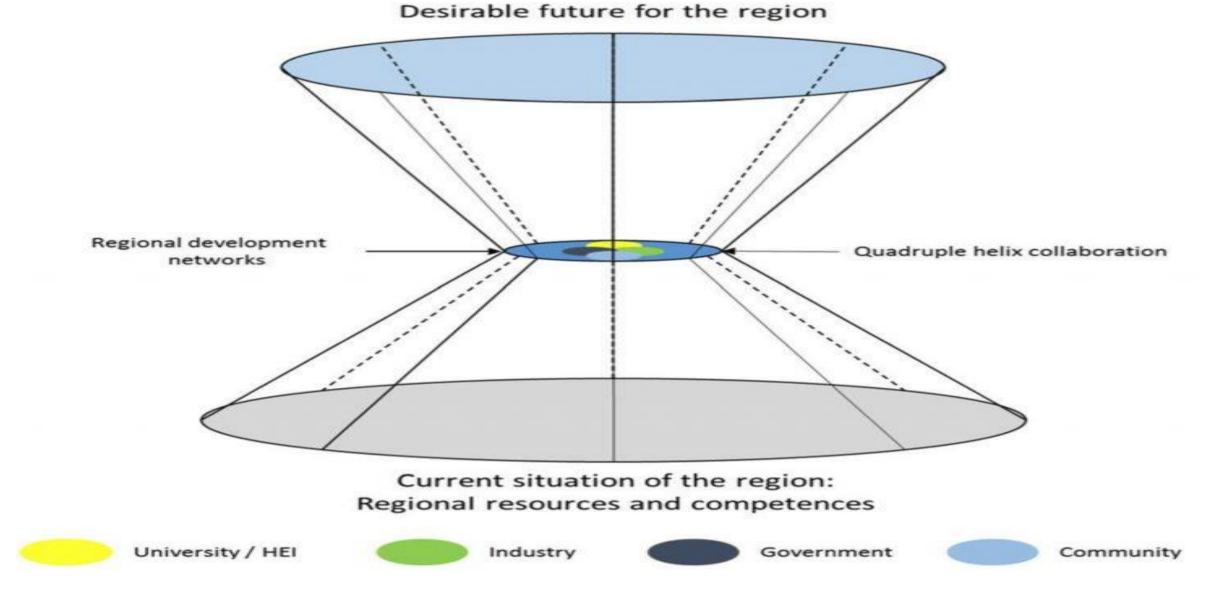
Applying the quadruple helix model of open innovation in knowledge-based development.

The quadruple helix model adds the element of citizenry/community.

QH Innovation Model

The use of QH model possibly can aid understanding and help ensure that our actions have a sound theoretical basis. This model of open innovation has the potential to assist with our IM process/infrastructure/service when linked to knowledge management, particularly in regards to:

- Evidence-based knowledge management, where there is significant support between the four helices of the quadruple helix model (academia, industry, government, community) and the four sources of evidence (scientific literature, practitioners, organisation, stakeholders).
- Knowledge management for development, where there is a noticeable attempt towards knowledge co-creation involving multiple stakeholders and a crossing of the boundaries between STEM scientists and society.



Double-Coin Model of Knowledge-Based Regional Development (source: Kolehmainen et al. 2016). Quadruple helix, innovation and the knowledge-based development: lessons from remote, rural and less-favoured regions. Journal of the Knowledge Economy, 7(1), 23-42

Mathematics in Industry around the World

By Hilary Ockendon



The Mathematics in Industry minisymposia panel at ICIAM 2015: (left to right) the late Yongji Tan (Fudan University), Zhijie Cai (Fudan University), Liqiang Lu (Fudan University), Huaxiong Huang (York University, Toronto), Shige Peng (Shadong University), Graeme Wake (Massey University, Auckland), and Hilary Ockendon (University of Oxford).

The 8th International Congress Industrial and Applied Mathematics (ICIAM 2015), was well represented by sessions on applied mathematics, but sadly. only 19 out of the minisymposia at the meeting held in Beijing in August were designated as 'industrial.' Among these, a series called "'Industrial Mathematics around the World," organized by the late Professor Yongji Tan (Fudan University) and Dr Yichao Zhu (Hong Kong University of Science and Technology), brought to light how different countries address industrial mathematics.

The talks in these minisymposia described how organized Mathematics in Industry started in Europe nearly 50 years ago and has since spread to all parts of the world. The overall trend, although not

participants 90 percent of whom were students.

- The Universiti Teknologi Malaysia- Centre of Industrial and Applied Mathematics has been working since 2011 to boost industrial mathematics in Malaysia. It is anticipated that it will become a national hub, one part of which will operate similarly to the Smith Institute.
- In Japan, the Institute of Mathematics for Industry in Kyushu University hosted a national forum in October. This is part of the recently-formed Asia-Pacific Consortium for Mathematics for Industry, which provides support for neighboring countries on the Pacific

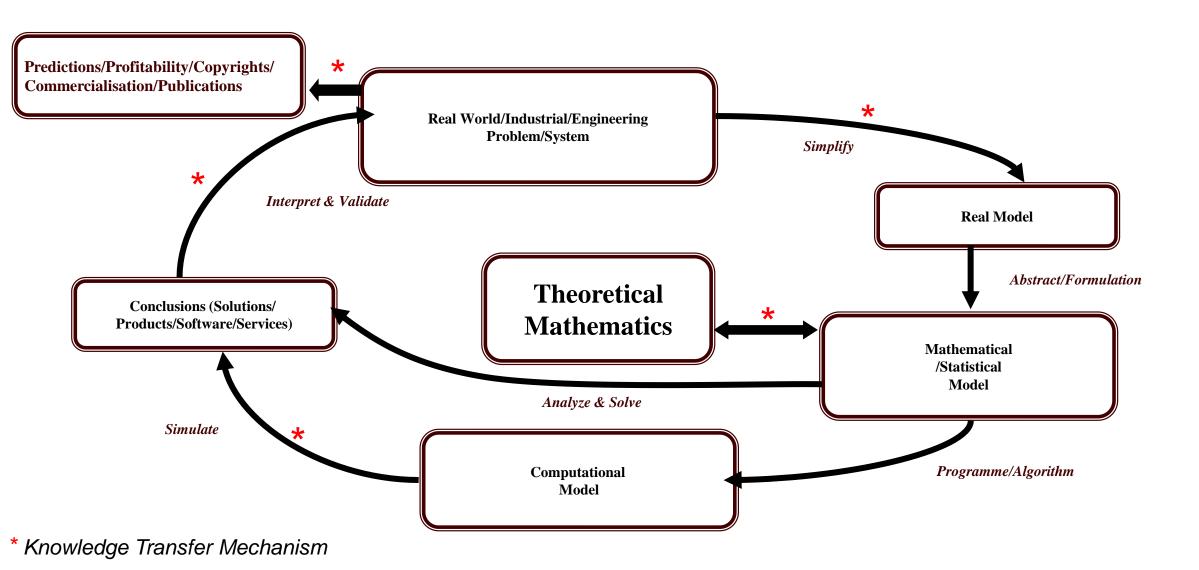
Rim and is similar to the European Consortium for Mathematics in Industry (ECMI) model in

Industrial Mathematics around the World

Hilary Ockendon OCIAM 3 December, 2018

- MACSI, Ireland, 2006 -
 - funded by government
 - Limerick is centre of an Irish network
- UTM-CIAM, Malaysia, 2011 -
 - model based on OCIAM
 - has set up a company to work with industry
 - network across SE Asia
- IMI Kyushu University, Japan, 2014 -
 - strong government/university support
 - emphasis on using pure maths for industrial problems
 - founded APCMfI

Our "Construction and Analysis of Models"



We propose a Quadruple Helix Innovation Model: Academia, Industry, Government & Community/Users

Academic engagement

- R&D
- Publication
- IP/Copyright
- Algorithms/Codes
- HiCoE/MyRA Instruments
- Research Grants

Pool of STEM Experts

- UTM & other universities
- Professional societies
- Government agencies & research centres/institutes
- Academia

Industry engagement

Industry

- Marketing
- Networking
- Industrial problems
- Collaborative effort with E-DEO

Income Generation

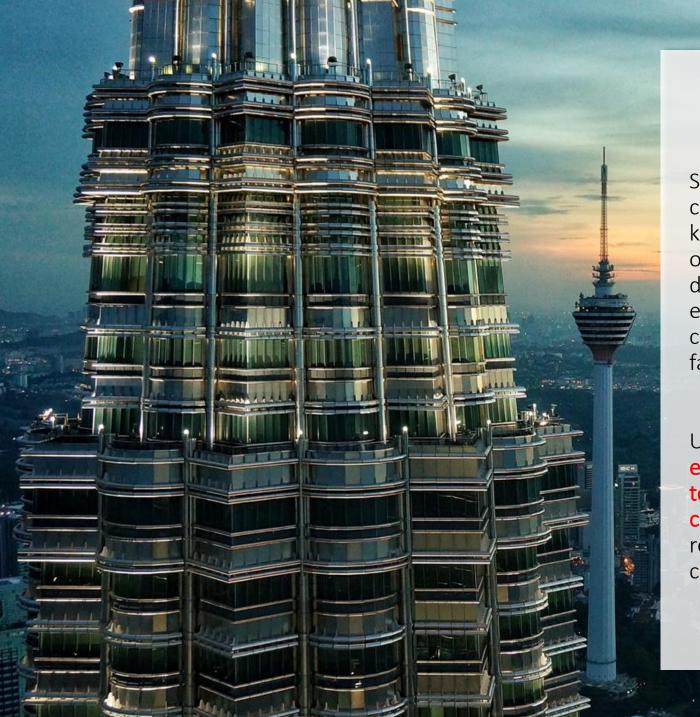
- Consultancy/Contract research
- Training/Workshop
- R&D event management Support UTM-CIAM signature activities: MISG, MIMMC, MMMC, ISMI, MMIW etc. for COMMUNAL talent development
- Proofreading & Editing (Scientific & Mathematical)

Synergistic collaborative/cooperative efforts

Industrial Partnership:

- Product conversion & marketing (Synapse, ICC,...)
- International networking & resources (E-DEO)





Why we are established?

Specifically Malaysia and generally for developing countries, the use of advanced mathematical knowledge in businesses, companies and organizations for their services, product developments or even running of the company itself especially for SME is still not evident. We hope to change this, especially in this globally connected, fast-paced world.

UTM-CIAM activities are targeted towards empowering industrial mathematics & statistics as tools for problem solving, innovation and commercialization. Our activities include industry related research, capacity building and industrial customized software development programs

Main objectives in setting up of UTM-CIAM

- > Capacity building in advanced research areas of industrial & applied mathematics.
- ➤ Intensify research & development (R & D) on collaborative industrial & applied mathematics with fields related to engineering and technology.
- Advance multidisciplinary R & D by strengthening the collaborative research, modelling and formulation of optimal & innovative solutions for the local industry.
- ➤ Promote practical & innovative applications of industrial and applied mathematics in industry to generate high quality applied research output.

MAIN ACTIVITIES

- ✓ MISG, ISMI, MMIW, MMMC & MIMMC
- ✓ UTM staff, MSc & PhD and postdoctoral training
- ✓ University Industry Collaboration/Linkage
- ✓ Research & Contract Grants Procurement
- ✓ Consultancy services
- ✓ Empowering Human Capital through STEM teachings & researchs
- ✓ Publications & managing journal MATEMATIKA: Malaysian Journal of Industrial & Applied Mathematics
- ✓ IP (Intellectual Property) development



In cooperation with



Oxford Centre for Industrial and Applied Mathematics (OCIAM)



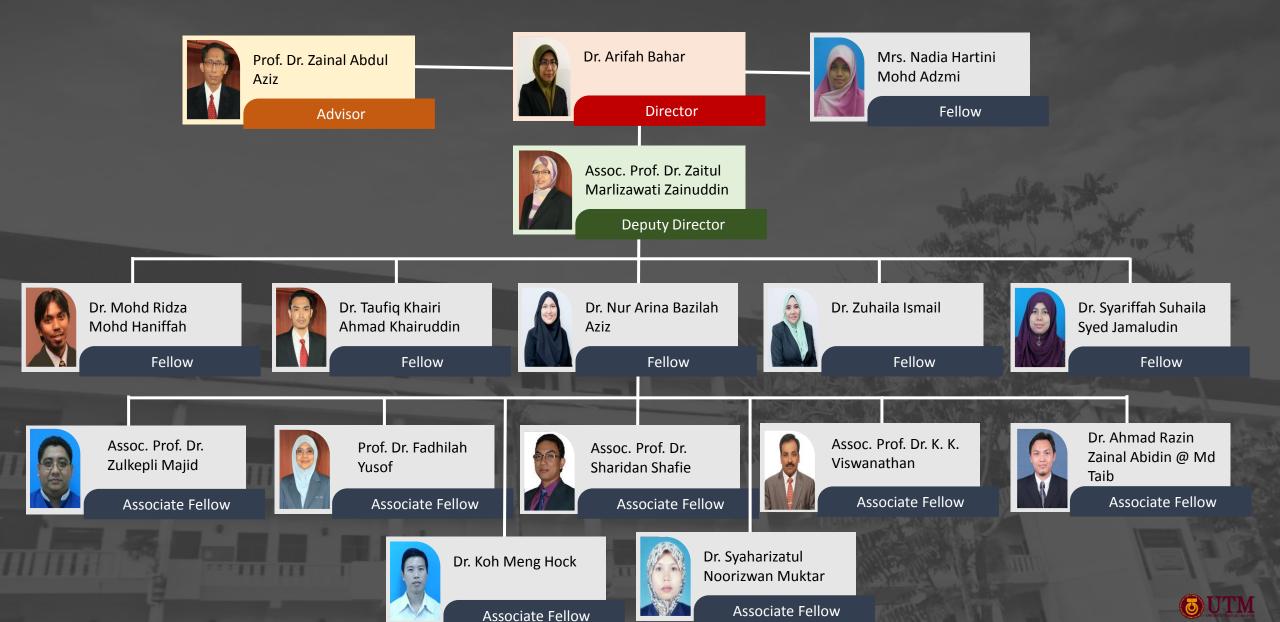
Smith Institute for Industrial Mathematics and Engineering, UK



Member of The Asia Pacific Consortium of Mathematics for Industry (APCMfI)



Staff of UTM-CIAM



Expertise

Industrial & Applied Applied Research Numerical & Computational Research Statistics



What we do?

Fundamental Researches

Solving a class of Robin problems in simply connected regions via integral equations with a generalized Neumann kernel Journal of Physics: Conference Series PAPER - OPEN ACCESS Related content MILP model for integrated balancing and assembly line balancing problems A D Wirawan and A Maruf sequencing mixed-model two-sided assembly line with variable launching interval and assignment restrictions Shuano Hu. Ke-Jun Li. Yanshun Xu et al Contents lists available at ScienceDirect To cite this article: N I L Mohd Azmi et al 2017 J. Phys.: Conf. Ser. 890 012107

Chinese Journal of Physics 55 (2017) 630-651



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journal homepage: www.elsevier.com/locate/ciph



Effects of thermal radiation, viscous and Joule heating on electrical MHD nanofluid with double stratification

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MHD nanofluid Doubly stratified flow Thermal radiation

The investigation is made to study the combined effects of thermal radiation, viscous dissipation and Joule heating in steady two-dimensional electrical magnetohydrodynami boundary layer flow of nanofluids using Buongiorno's model over a permeable linear stretching sheet. The system of transport equation incorporate the effects of Brownian mo tion, thermophoresis, thermal and concentration stratifications in the presence of nano energy conversion emerging parameters. A similarity transformation is implemented to reduce the boundary layer flow equations to a system of nonlinear ordinary differentia equations, then solved by implicit finite difference scheme. The computation has been investigated for certain range of values required emerging parameters $M(0 \le M \le 2.5)$, $E_1(0 \le E_1 \le 1.0)$, $s(-0.4 \le s \le 1.0)$, $\lambda(0.1 \le \lambda \le 2.0)$, $N(0.1 \le N \le 1.0)$, $Rd(0 \le Rd \le 1.0)$ $Nb(0.1 \le Nb \le 0.5)$, $Nt(0.1 \le Nt \le 0.5)$, $Ec(0 \le Ec \le 0.8)$, $s_t(0 \le s_t \le 0.7)$, $Le(2 \le Le \le 10)$ s. (0 < s. < 0.7). Velocity field enhances with the electric field and mixed convection but decreases with fluid suction. Electric field resolved the sticking effects due to the magnetic field. Thermal and concentration stratifications lead to a reduction in temperature and nanoparticle concentration. Heat conduction is sensitive to an increase in an electri field, thermal radiation and viscous dissipation. The rate of heat and mass transfer reduce by increasing thermophoresis and thermal stratifications and it increases for larger val ues of suction. Numerical values are obtained for the skin friction, local Nusselt and Sher wood number for different involving parameters tabulated and examined. We compare the present numerical solution in limiting sense with previously published investigation pre sented and examined reveals good agreement.

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Boundary layer flow and convective heat transfer problem in nanofluids due to stretching sheet has drawn attention of many researchers as results of its widely applications and importance recently. Nanofluids are being produced by dispersing of metallic/non-metallic/fiber solid particles with a typical size of less than 100 nm into base liquids having low thermal conductivity mostly in water ethylene glycol oils etc. These fluids are the conventional heat transfer fluids with poor heat transfer rate. Nanofluids properties are presume to be effective on convective flows and heat transfer such as thermal

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odelling contaminant transport for pumping wells in riverbank

Journal of Environmental Management journal homepage: www.elsevier.com/locate/jenvma



ResearchGate

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le history: ived 22 April 2015 ived in revised form stember 2015 pted 17 September 2015 able online 1 October 2015

Analytical study of the influence of both the pumping well discharge rate and pumping time on contaminant transport and attenuation is significant for hydrological and environmental science applirations. This article provides an analytical solution for investigating the influence of both numning time and travelling time together for one-dimensional contaminant transport in riverbank fiftration systems by using the Green's function approach. The basic aim of the model is to understand how the pumping time and pumping rate, which control the travelling time, can affect the contaminant concentration in riverbank filtration systems. Results of analytical solutions are compared with the results obtained using a MODFLOW numerical model. Graphically, it is found that both analytical and numerical solutions have almost the same behaviour. Additionally, the graphs indicate that any increase in the pumping rate or simulation pumping time should increase the contamination in groundwater. The results from the proposed analytical model are well matched with the data collected from a riverbank filtration site in France. After this validation, the model is then applied to the first pilot project of a riverbank filtration system conducted in Malaysia. Sensitivity analysis results highlight the importance of degradation rates

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riverbank filtration system (RBF) refers to the process of cting potable water from a pumping well adjacent to a river . This process is typically used when river water becomes itable for direct usage. The water is treated naturally via a ogical process occurring in riverbed sediments (Hiscock and presence of contaminants in the water supply from pumping in an RBF affects the quality of produced water and conse atly promotes the investigation of contaminant transport. In years, river water was polluted to a considerable degree by ous pollutants (Bu et al., 2014: Chang et al., 2015). The pollution ver water has multiple sources, such as industrial wastes,

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agricultural fertilizers, landfill leachate and land transportation Several efforts have been devoted to understanding the behav-

iour of contaminants in the subsurface (Dash et al., 2010; D et al., 2002; Hoppe-Jones et al., 2010; Malaguerra et al., 2013 Singh et al., 2010b; Thakur et al., 2013). These efforts involve studying chemical, biological and physical processes that describe the contaminant attenuation and transportation. Understanding these processes is most useful for various environmental applica tions, such as in situ bio-remediation (Chen-Char Kojouharov, 2008), riverbank filtration (Dash et al., 2010; Dillon t al., 2002; Hiscock and Grischek, 2002; Holzbecher, 2006; Malaguerra et al., 2013), and protection of drinking water supplies (Zhang et al., 2008). An improved comprehension of the fac tors controlling the fate and transport of contaminants in RBF systems is also important in planning and managing new sites. Successful risk assessment of pollutants transport requires a means such as mathematical modelling, to predict the transport potential Mathematical models of groundwater pollution have been

studied in literature since at least 1961 (Domenico, 1987; Elfeki



What we do?

Industrial Customized Software





Optimal Stock Level and Inventory Policy

The challenge

High production downtime that is caused by the stock runs out for sub-components required in the production lines due to the failure of suppliers to deliver components on time.

The solution

Improving inventory system and production plan using mathematical models and a prototype system in determining the optimal production quantity and allocation of resources.

The benefit

Improve the inventory system and decision making for production planning.



UTM Centre for Industrial and Applied Mathematics

http://ciam.utm.my





Optimisation System for Production of Chicken Products

The challenge

Growing demand for halal chicken products.

The solution

Chicken Production Optimizer (CPO) software.

The benefit

Improved decision making to ensure optimal production of chicken products.



UTM Centre for Industrial and Applied Mathematics

http://ciam.utm.my



What we do?

Signature Activities



Mathematics in Industry Study Group (MISG)



International Seminar on Mathematics in Industry (ISMI)



Malaysian Mathematics in Industry Workshop (MMIW)



Malaysia Mathematical Modelling Camp (MMMC)



Malaysia Industrial Mathematical Modelling Camp (MIMMC)



Young Talent Consultancy Camp (YTC)



Mathematics in Industry Study Group Malaysia (MISG)

2011

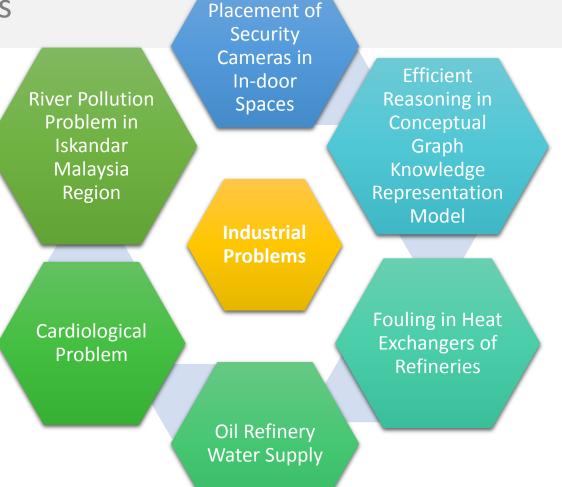
4 Industrial partners, 6 Problems











Optimal

Mathematics in Industry Study Group Malaysia (MISG)

Optimization for Treatment of

6 Industrial partners, 6 Problems

2014

Cost Effective Minimum Water and Energy **Networks for The Industries**

Development of system for rice blast and brown planthopper (BPH), pest and disease of rice

Oxidation Pond

Industrial **Problems**

Coronary Bifurcation-**Effect of Stent** on Blood Flow

Green Propulsion Regenerative Electromagnetic **Suspension System** (GPRESS)















Mathematics in Industry Study Group Malaysia (MISG)

2015

7 Industrial partners, 7 Problems















Modelling the Optimal Conservation of **Giant Clam Species** in Johor Islands

Modelling and Optimization of Clay-based Product for Green Cleansing

> **Optimal Stock** Level and Inventory Policy

Modelling Thiophene and Pyran-4-ONE to Early Signs of Ganoderma Infection in Oil Palms

INDUSTRIAL PROBLEMS

Subsea Cable Laying

Multi-Sensor **Imaging System**

Magneto-Rheological Semi-**Active Suspension** System



International Seminar on Mathematics in Industry (ISMI)



27th – 28th November

2013

2017

2018

- A platform for mathematical scientists and industry practitioners to share their experiences in handling real industrial problem through mathematical ideas and tools.
- Strengthening collaborations among mathematicians from around the world.
- Promote and support the use of mathematical models in industry for a sustainable environment and optimal allocation of resources.



International Seminar on Mathematics in Industry (ISMI)

2013

1st – 2nd August

2017

2018



Introducing Malaysian Mathematics in Industry Workshop (MMIW2017), a special engagement session with industry practitioners/researchers where participants are given the opportunity to work on industrial problems shared by industries using diverse mathematical approaches.



Malaysian Mathematics in Industry Workshop (MMIW) 2017

2 Problems

2017

2018



Analysis of the seagrass ability to grow in the Johor coastal area





- How to apply K-Nearest Neighbor (KNN) and K-Dimension Partioning/indexing (K-DTree) method for the processing of 3D point clouds data using Matlab software? How to use these two methods to speed up the processing time for big dataset of 3D point clouds data?
- How to apply Principal Component Analysis (PCA) in analyzing the geometrical component of the 3D point clouds data? How to produce the Matric A of the point clouds dataset using PCA?

International Seminar on Mathematics in Industry (ISMI)

2013

2017

2018



4th – 6th September

Joint conference with Institut Teknologi Sepuluh Nopember, Surabaya Indonesia, called International Seminar on Mathematics in Industry & International Conference on Theoretical and Applied Statistics (ISMI-ICTAS18), with MMIW2018



Malaysian Mathematics in Industry Workshop (MMIW) 2018

2017

3 Problems

2018



Telemong River Bifurcation for Flood Mitigation



Time versus Gain Analysis for Crude Palm Oil Trading



Cable Installation Analysis in Deep Water Environment





Malaysia Mathematical Modelling Camp (MMMC)

2015

30th March – 2nd April

- hands-on experience of mathematical modelling under the guidance of an experienced instructor
- broad range of problem-solving skills, such as mathematical modelling & analysis, scientific computation & critical assessment of solutions
- enhances the social networks and cooperation among participants





Student & Staff Attachment



15th October – 14th November

2015

- Student and staff attachment at Mathematical Institute, University of Oxford
- Research discussion with experts
- Exposure to the student and staff on how to work, learning environment and networking



Malaysia Industrial Mathematical Modelling Challenge (MIMMC)

2015

11th November

2019



Problem 1: Canned Pineapples Problem 2: Surface Water Pollution Problem 3:
HydroElectric
Power
Generation

- MIMMC is a group-based competition.
- Offers the experiences and challenges that enhanced the participants' intellectual capabilities, knowledge and skills in solving real world problem through mathematical modeling.
- This competition is open to all local undergraduates at any Malaysian university or tertiary institution.



Malaysia Industrial Mathematical Modelling Challenge (MIMMC)

2019

18th March



Problem 1:

Crude Palm Oil Futures: To Buy or Not?

Problem 2:

Analysis of The Seagrass Ability to Grow in the Johor Coastal Area

Problem 3:

River Bifurcation



Young Talent Consultancy Camp (YTC CAMP)



1st – 2nd November

2016

- a camp that trains young talents to become technology translators who are able to mediate between academicians and industrial practitioners.
- give more exposure to the mathematicians on how to consult the industries by understanding the industries business needs and know what business decisions might be on their desk that we can help them with.
- identify how to apply mathematical sciences that would add value to their business.





What's next?

UTM-CIAM engages industries and has a lot of activities involving capacity building and problem solving with industries and communities, and these require substantial financial support and with the current scenario of economic slow down, this is thus unsustainable.

Moving forward, to maintain UTM-CIAM and its important & impactful signature activities, we require ways to generate finance and aggressive marketing of UTM-CIAM's expertise & "products".

Further consultation with OCIAM & Smith Institute, UK, for a sustainable model, we have decided to set up UTM-CIAM's dedicated business arm - MYHIMS Solutions LLP and proposed a synergy based on the Quadruple Helix Innovation Model.

Dedicated Business Arm



Industrial Mathematics & Statistics Solutions Provider



+6011-11227016



myhims.solutions@gmail.com



http://myhims.my

WHAT IS MYHIMS SOLUTIONS LLP?

Industrial Mathematics & Statistics Solutions Provider

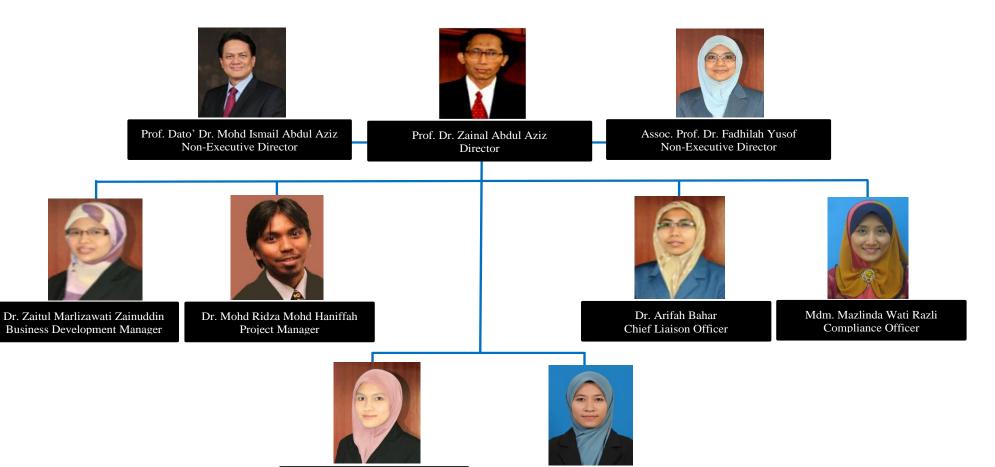


MYHIMS Solutions LLP is simply a dedicated business arm of UTM-CIAM.

MYHIMS Solutions LLP is a Limited Liability Partnership (LLP) company that offers industrial mathematics and statistics consultancy services via national network of experts in solving industrial problems



Staff of MYHIMS Solutions PLT



Mdm. Nor Liyana Sabari

Research Officer

Dr. Nur Arina Bazilah Aziz

Business Development Officer







enhance your business today, tomorrow and for years to come

ABOUT US

MYHIMS Solutions PLT is a Limited Liability Partnership (LLP) company that offers industrial mathematics and statistics consultancy services via national network of experts in solving industrial problems.

EXPERTISE

- Engineering & Industrial Mathematics
- Operations Research
- Numerical & Computational Methods
- Data Analysis & Statistical Modelling

 Geospatial Analysis



MYHIMS SOLUTIONS PLT, Level 3, C08, UTM-CIAM Universiti Teknologi Malaysia myhims.solutions@gmail.com ciam.utm.my/myhims-solutions-plt

SERVICES

- Industrial Mathematics & Statistics Solutions Provider
- Mathematical ModellingSystem Validation & Optimisation
- ➤ Industrial Process

- Enhancement

 Data Analysis

 Decision Support

 Event Management

 STEM Talent Development

OUR EXPERTISE



OUR SERVICES







Industrial Mathematics & Statistics Solutions Provider

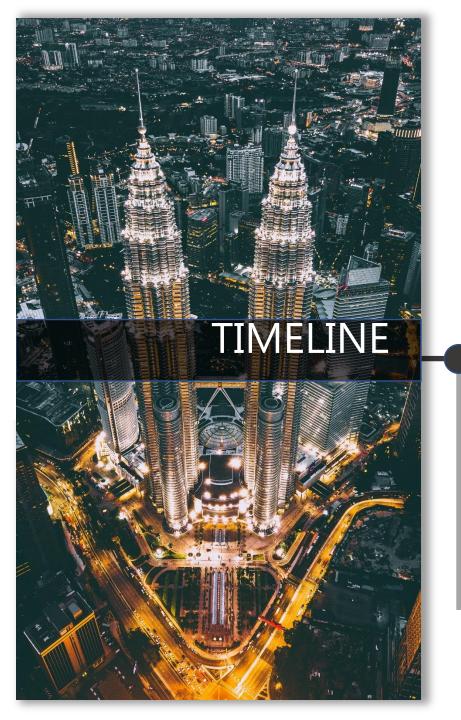
Mathematical Modelling,
System Validation &
Optimization, Industrial
Process Enhancement,
Data Analysis, Decision
Support

Educational Event Management

Seminar, Conference, Training Workshop

STEM Talent Development

MISG, MMIW, MIMMC, YTC Camp, MMMC, Training and Workshop



Nov 2017

- Approval from UTM authorities to establish MYHIMS
- Appointment of compliance officer

Present

- Website development for MYHIMS (in progress)
- Set up proofreading and Editing Unit (done)

Dec 2016

Establishment of MYHIMS pro-tem committee

Feb 2018

MYHIMS has been registered as Limited Liability Partnership

Industry Engagement

Apr 2018

Critical Thinking & Problem
Solving Assessment Consultation
for Universiti Teknologi PETRONAS
(done)

Jan 2019

- Smart Entrepreneurship
 Training for SME Corporation
 (in progress)
- Cable Installation Analysis in Deep Water Environment for IFACTORS Sdn Bhd (done)

Present

- Telemong River Bifurcation for Flood Mitigation for Perunding IRZI Sdn Bhd (done)
- Automated Crude Palm Oil Futures (FCPO) for Matheraft Solutions (in progress)
- Airport Delay Prediction using Weather Impact Index (in progress)
- Commercialize products from software development activities
 - Attendance Management System (in progress)
 - Optimal Stock Level & Inventory System (in progress)
 - Chicken Optimizer System (in progress)

Academic Engagement

Sept 2018

Event Management: International Seminar on Mathematics in Industry & International Conference for Theoretical and Applied Statistics ISMI-ICTAS18 (done)

March 2019

Consultation work for Malaysia Industrial Mathematical Modelling Challenge 2019 (done)

Present

Event management: What Can You Do With MATLAB Programming Workshop (done)

Academic engagement

- R&D (Industrial & Applied Maths)
- Publications (High Impact)
- MATEMATIKA (Management & Publication)
- IP/Copyright
- Algorithms/Codes (Solution Schemes)
- HiCoE/MyRA Instruments (KPI driven)
- Research Grants (National & International)

Pool of STEM Experts

- UTM & other universities
- Professional societies
- Government agencies & research centres/institutes
- Academia

Industry engagement

Industry

- Marketing (Expertise & Decision Support Solutions)
- Networking (National & International)
- Industrial problems (Customized SoftwareProducts/Patents)
- Collaborative effort with E-DEO

Income Generation

- Consultancy/Research Contract
- Training/Workshops
- R&D event management Support UTM-CIAM signature activities: MISG, MIMMC, MMMC, ISMI, MMIW etc. for **COMMUNAL** talent development
- Proofreading & Editing (Scientific/Mathematical)

Synergistic collaborative/cooperative efforts

Industrial Partnership:

- Product conversion & marketing (Synapse, ICC,...)
- International networking & resources (E-DEO)

Our Possible Forward-Looking Options (ICIAM2019 Valencia)



- Zainal, MYHIMS Solutions LLP
- Dr Arifah Bahar, Director Of UTM-CIAM

- Professor Aderito Araujo, Coimbra
 University, Portugal (President of ECMI)
- Professor Deitmar Homberg, Weirstrass
 Institute for Applied Analysis & Stochastics,
 Germany (Past President ECMI)

Terima Kasih/Thank You/Gracias

