

## ABOUT INFORMM

Institute for Research in Molecular Medicine (INFORMM) is a Higher Institution Centre of Excellence (HiCoE) in "Diagnostics platform".

## AT A GLANCE

This mobility programme is supported by experienced PhD qualified lecturers, skilled technical support staff and friendly energetic student buddies (1 host buddy: 2 participants).

## ABOUT THE PROGRAMME

The mobility@INFORMM programme focuses on current topics in *in-vitro* diagnostics, advanced research technologies and cancer research. Participants can choose to follow the educational activities under 'Diagnostics & Advanced Research Technologies' or 'Cancer Research' groups. Medium of communication is in English.



## CONTACT INFORMATION

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**NOW EVERYONE  
CAN LEARN ABOUT  
MOLECULAR  
MEDICINE!**



# MOBILITY @INFORMM

## PENANG PROGRAMME

## PROGRAMME STRUCTURE

This is an intensive, residential two week programme. Students can choose ONE of the following groups and TWO elective lectures\* :

### 1) Diagnostic & Advanced Research Technology

- *In-vitro* Diagnostic Technologies
- Biological Marker Discovery
- Bioinformatics
- Antibody Engineering
- Immunotherapy



### 2) Cancer Research

- Molecular Basis of Cancer
- Cancer Diagnosis
- Cancer Therapy
- Translational Research
- Cancer Awareness and Prevention

\* Please refer to **INFORMM** website for details of the lecture topics, synopsis and elective courses.

## HOW IT WORKS

Lectures will be informal and interactive. These will be complemented by fun indoor or outdoor hands-on activities. Sharing sessions on science and culture provide a holistic experience.

## WHO CAN ENROL

This programme is suitable for undergraduates, A-level international school students and science enthusiasts interested in the biomedical-related field.

## WHAT YOU WILL GET

Upon completion, a certificate will be awarded. Participants will gain an overview of molecular medicine, a range of laboratory skills and a unique Malaysian cultural experience.

## OUTDOOR ACTIVITIES

- Explore flora and fauna of tropical rainforest of Malaysia such as Penang National Park, Entopia, Royal Belum Forest etc.
- Cultural activities –culinary delights, traditional games and Georgetown UNESCO heritage tour, etc.

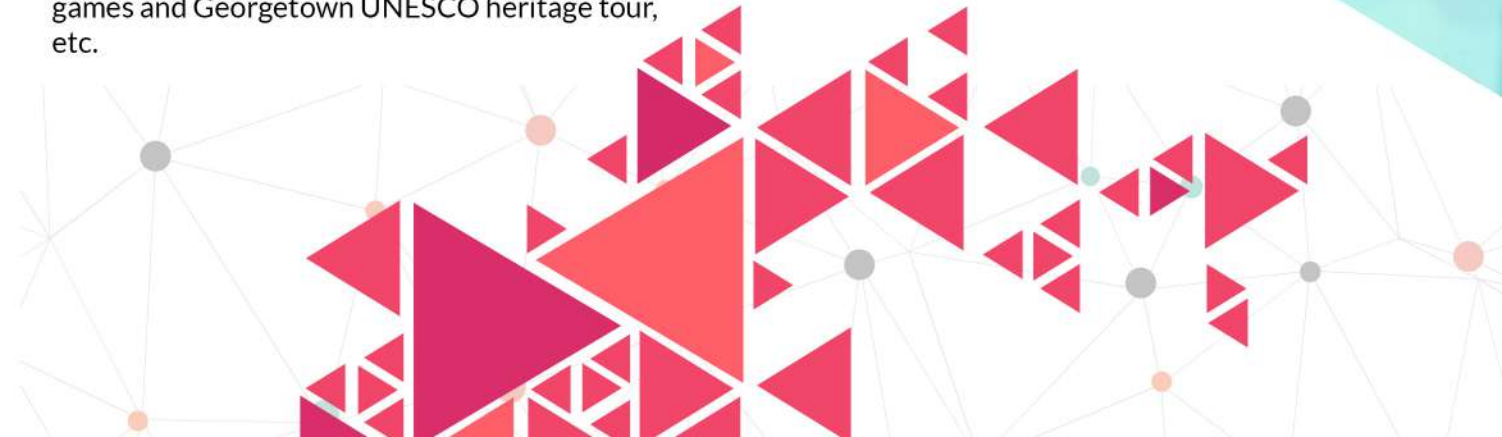
## PROGRAMME REQUIREMENTS

Minimum number of participants :  
15 persons per group

## PROGRAMME FEE \*

Malaysian per pax RM4,000.00+  
International per pax USD1,000.00+

*\*Estimated fee shown includes hostel accommodation and outdoor activities but does not include arrival and departure travel costs.*



Speaker	Topic/Code	Synopsis
Dr. Oon Chern Ein	B02: Blood vessels and tumour networking	The growth of new blood vessels is known as angiogenesis. Angiogenesis is central to tumour growth. Cells in the core of a tumour with a volume greater than 2mm <sup>3</sup> can trigger angiogenesis due to lack of oxygen & nutrients. Ultimately, this increases the supply of nutrients and O <sub>2</sub> to the tumour, thereby supporting tumour growth & progression. Angiogenesis can also promote the spread of tumour, a process known as metastasis. The new blood vessels act as a passage for cancer cells to travel to distant sites where the cancer cells lodge to form a new secondary tumour. When the blood supplies are disrupted, tumours may starve & eventually die. This lecture will elaborate on how blood vessels can be manipulated as a strategy to shrink tumours.
Prof. Dr. Gurjeet Kaur Chatar Singh	B03: How is cancer diagnosed?	Understand the role of a pathologist who examines biopsies & tissues that are removed surgically. This talk will enlighten you on the steps involved when the tissue is received at the pathology laboratory and how the pathologist arrives at a diagnosis.
Dr. Ong Ming Thong	B04: Translational Cancer Research – An Introduction	This lecture will examine the steps from benchside (research) to bedside (clinical) in cancer research. The general process of translating cancer research findings into clinical treatment options, drug development and diagnostic tools, as well as bringing clinical difficulties back to the research bench for further development will be introduced.
Dr. Lai Ngit Shin	B05: Chemical biology of cancer	Target validation is a crucial element of drug discovery. Chemical biology strategies are essential for robust target validation by using chemical tools & other chemical biology approaches to target validation in cancer.
Assoc. Prof. Dr. S. Sasidharan	B06: Green therapy for cancer treatment	Medicinal plants have been used for therapeutics purposes since the beginning of human history & are the blueprint of most modern medicine. Most chemotherapeutic drugs for cancer treatment are molecules identified and isolated from plants or their synthetic derivatives. This lecture will focus on the importance of ancient herbal remedies towards the development of green therapy.
Dr. Chew Ai Lan	B07: Diet and Cancer Prevention	A healthy diet is an important preventive action that may safeguard one's health & reduce the risk of cancer. Many dietary choices have long been studied to find out if they increase cancer risk or can help prevent cancer. These include dietary constituents (including 'energy & related factors', notably physical activity), foods & drinks, food processing (production, preservation, processing, and preparation) and micronutrients.
Assoc. Prof. Dr. Khoo Boon Yin	B08: Cancer science education	Cancer science education is a professional development course to encourage innovation and promote creative approaches in cancer science learning. The talk will cover the history of cancer science education, describe the process of creative science learning and introduce the learning resources.
Dr. Daruliza Kernain Mohd Azman	B09: The Danger of Cancer Causing Agents in Personal Care Products	We are exposed to the chemicals from personal care products when we breathe them in via sprays & powders, when we swallow them by getting them on our lips & when we absorb them through our skin and mucous membranes. Many of the chemicals used in personal care products are cancer-causing & endocrine disruptors. Endocrine disruptors, such as BPA, pesticides & phthalates, mimic oestrogen & interfere with the body's hormone & cell signalling system. This can cause adverse developmental, reproductive, neurological & immune effects. This lecture covers on how chemicals present in the daily care products could interfere with the normal physiological function in the body thus lead to the cancer development.

## ELECTIVE LECTURES

### Speaker

Dr. Lai Ngit Shin

Assoc. Prof. Dr. Venugopal Balakrishnan

Dr. Leow Chiuan Heng

Dr. Japareng Lalung (School of Industrial Technology)

Dr. Yeoh Kah Kheng (School of Chemical Science)

### Topic/Code

E01: Safety in Laboratory

E02: Biosafety and Biosecurity

E03: How to boost your immune system

E04: Antarctic research: experience, expectations, and opportunities!

E05: 1-Hour EQ Mindfulness Workshop

### Synopsis

The laboratory environment can be a hazardous place to work. Laboratory users are exposed to numerous potential hazards including chemical, biological, physical and radioactive hazards, as well as musculoskeletal stresses.

Biosafety is complementary to biosecurity, and refers to the implementation of laboratory practices and procedures, specific construction features of laboratory facilities, safety equipment, and appropriate occupational health programs when working with potentially infectious microorganisms and other biological hazards. These measures are designed to reduce the exposure of laboratory personnel, the public, agriculture, and the environment to potentially infectious agents and other biological hazards.

What can improve your mood, boost your ability to fend off infection, and lower your risk for heart disease, diabetes, high blood pressure, and colon cancer? I will share with you all the secret tips to boost your immune system.

In 2015-2016, Dr. Japareng Lalung went to Signy Island, a British Antarctic Territory with the British Antarctic Survey team to evaluate the impact of climate change towards algal diversity at the Island. This talk is about his journey to the south. He will also reveal the opportunities to go to Antarctica and the possibility to apply for a research grant and fellowship to conduct an Antarctic research.

Mindfulness means paying attention to what's happening in the present moment in the mind, body and external environment, with an attitude of curiosity and kindness. An ancient wisdom practice supported by modern neuroscience, Mindfulness has been considered as a new 'Superpower' to equip everyone to adapt to high degree of complexity in today workplace. Elite business schools such as Harvard, Stanford, and MIT have turned to Mindfulness to achieve excellence for developing the next generation of leaders. Industry giants including Google, SAP and Intel are among the many companies that offer structured programs of Mindfulness to promote work performance and wellbeing. Google has its own in-house Mindfulness Based Emotional Intelligence training program namely, Search Inside Yourself (SIY) that has been highly appraised by its employees.

## CONTACT INFORMATION

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**INFORMM**  
INSTITUTE FOR RESEARCH IN MOLECULAR MEDICINE

**MOBILITY  
@INFORMM  
PENANG  
PROGRAMME**

**INSTITUTE FOR RESEARCH IN  
MOLECULAR MEDICINE (INFORMM)**  
UNIVERSITI SAINS MALAYSIA

## INSTITUTION PROFILE

**INFORMM** started as a multi-disciplinary cluster-based research program spearheaded by eleven main researchers from the Schools of Medical Sciences, Dental Sciences, Health Sciences and MITD (Medical Innovation and Technology Development Unit) located at the USM Health Campus in Kelantan.

After a rigorous process, the Institute for Research in Molecular Medicine (INFORMM) was established in 2003 following a formalized recognition accorded by the University and the Ministry of Higher Education. This was also the first time in the history of USM that an institute was formed "bottom-up" through the efforts of a group of researchers. As a fully fledged research institute, INFORMM moved into its building in Kelantan in 2003, and at this time, the Penang branch was set up at the Eureka Complex, USM.

In December 2007, the Penang team moved to its own new building. From the initial members of the loose research cluster, INFORMM now boasts of full-time lecturers with PhD qualifications. Currently, the main research clusters at INFORMM are 'Diagnostics for Infectious Diseases', 'Advanced Research Technologies' and 'Cancer Research'.

The multidisciplinary character of the institution has been maintained and is reflected through the staff development plan of its younger members, who have been trained in the latest techniques in biotechnology and molecular biology, ranging from recombinant antibody development, protein expression and characterization, in-silico modelling, biomarker discovery, proteomics and nano-biotechnology.

Website : [www.informm.usm.my](http://www.informm.usm.my)

## PROGRAMME OVERVIEW

**The Mobility@INFORMM Penang** programme focuses on the current topics of the cellular and molecular basis of diseases, latest advanced research technologies and *in-vitro* diagnostic test development. This programme seeks to empower participants by providing a basic understanding of the field of molecular medicine through leisure and flexible type of lectures and hands-on experience in research in the biomedical field.

Participants can choose to follow the educational activities under 'Diagnostics and Advanced Research Technologies' or 'Cancer research' groups. Medium of communication is in English. Upon completion, a certificate of participation will be awarded by INFORMM, Universiti Sains Malaysia.

### Programme Objectives

Upon completion of this programme, participants will be introduced to :

- The various fields of molecular medicine including biomarker discovery, development of *in-vitro* diagnostics, cancer biology and advanced research platforms.
- Basic laboratory techniques in molecular medicine using state-of-the-art facilities at INFORMM
- Malaysian cultural and outdoor experiences

## PROPOSED SCHEDULE

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Orientation - Ice breaking - Campus tour	- Lecture 1 - Lecture 2 - Lecture 3 - Culture 1	Hand-on	- Lecture 4 - Lecture 5 - Elective 1	- Lecture 6 - Lecture 7 - Culture 2	Homestay or Team Building Programme	Homestay or Team Building Programme
- Lecture 8 - Lecture 9 - Elective 2	Final Presentation -Heritage tour	Visit 1	Visit 2	Visit 3	Depart home	Arrival

## PROGRAMME LECTURERS & SYNOPSIS

### DIAGNOSTICS FOR INFECTIOUS DISEASES & ADVANCED RESEARCH TECHNOLOGIES CLUSTERS

Speaker	Topic/Code	Synopsis
Dr. Eugene Ong Boon Beng	A01: Gene cloning and recombinant protein expression	This introductory lecture will cover the basics of gene cloning techniques, types of plasmids and fusion tags for the expression of the protein of interest, and the selection of appropriate hosts for the expression of recombinant proteins. Protein purification methods will also be briefly covered.
Dr. Mervyn Liew Wing On	A02: An Introduction to Recombinant Protein Expression and Purification	Recombinant proteins are currently utilised for a myriad of biomedical and biotechnological applications. However, researchers new to this area might find themselves confounded by the vast array of choices available for protein expression and purification. Therefore, the aim of this session is to provide a brief introduction to advantages and disadvantages associated with protein expression hosts and unit operations involved in protein isolation.
Dr. Norsyahida Arifn	A03: Translation of human strongyloidiasis diagnostic biomarkers towards product development	Parasitic diseases account for roughly 90% of global disease burden, many of which affect the poorest in developing and third world countries. Strongyloidiasis, in particular, is considered the most neglected of the neglected parasitic diseases due to the major challenges presented in detecting the infection and the complex diagnostic methods. This lecture will highlight the diagnostic biomarker discovery of human strongyloidiasis and its translation towards product development for improved diagnosis of human strongyloidiasis.
Prof. Dr. Rahmah Noordin	A04: <i>In-vitro</i> diagnostic test: from the bench to the people	This lecture will describe the journey taken from the initial research ideas, the discovery process, test development & evaluation/validation and commercialization of a lateral flow rapid test for lymphatic filariasis, Brugia Rapid, that is recognised by the World Health Organization (WHO).
Dr. Nurulhasanah Othman	A05: Proteomics technologies for biological marker discovery	Proteomics technologies are powerful tools to discover biological markers that can be further used for disease diagnosis as well as vaccine and drug development. The mainstream technology utilises mass spectrometry. At INFORMM the non-gel based proteomics workflow is established for protein identification and quantitation using LC-MALDI-TOF/TOF.

Speaker	Topic/Code	Synopsis
Dr. Lim Theam Soon	A06: Antibody phage display	Antibodies are useful proteins for biomedical applications. There are several methods to produce monoclonal antibodies. However, phage display provides an easy alternative in comparison to the conventional hybridoma method. Antibody phage display allows the generation of recombinant antibody formats which can be easily manipulated and engineered. The application of phage display derived antibodies has successfully been reported for various biomedical applications.
Dr. Leow Chiuan Herng	A07: Exploration of natural single domain antibodies	Single domain antibodies (sdAb) are recognized as the smallest natural antigen-binding units of antibodies, consisting either only of one variable domain or one engineered constant domain that solely facilitates target binding. Because of their high affinity and specificity as well as stability, small size and benefit of multiple re-formatting opportunities, these molecules have become promising candidates for biomedical applications, as some of these entities have already been proven to be successful in clinical trials.
Dr. Choong Yee Siew	A08: Molecular modelling in biological research	Powerful techniques in molecular biology, X-ray crystallography and nuclear magnetic resonance spectroscopy have led to high resolution of biomolecules' three-dimensional structures. However, due to the limitation of the experimental methods, molecular modelling approaches have been applied to elucidate structures of biomolecules. In addition, advances made in computational resources have also enabled the dynamics and the interactions of biomolecules to be modelled. The structural analysis could provide insight into a structure-function relationship, the design of new inhibitors/binders, as well as the modelling of a biological system. This lecture will provide the overview of the concept of molecular modelling approaches and the challenges in molecular modelling.
Dr. Tye Gee Jun	A09: Introduction to Immunotherapy	Immunotherapy is the use of substances to induce the patient's own immunological system to combat diseases. Current advances in Immunotherapy has led to the capability of generating specifically targeted responses towards a certain disease and has garnered a lot of traction on the international medical research society. In this talk, we will introduce the basis of Immunotherapy and discuss the types of immunotherapies in used in the clinic.

## CANCER RESEARCH CLUSTER

Speaker	Topic/Code	Synopsis
Assoc. Prof. Dr. Venugopal Balakrishnan	B01: Molecular oncology	Molecular oncology is the identification of genes that are involved in the development of cancer. The scientist combines diverse techniques ranging from genomics, computational biology, tumour imaging, in vitro and in vivo functional models to study biological and clinical phenotypes. The proteins produced by these genes may serve as targets for novel chemotherapy drugs and other cancer treatments, or imaging scans. A range of techniques are used to validate the role of the novel candidate genes in the development of cancer. The ultimate aim is to translate these findings into improved treatment options for cancer patients.