Taking Biosciences to Malaysia: a tropical journey

Peter Alderson

MALAYSIA

Consists of West Malaysia (Peninsula) and East Malaysia (Sabah and Sarawak), separated by the South China Sea

Just north of the equator, it has a tropical climate with two monsoon seasons

ABOUT THE COUNTRY

- Land mass of 127,350 sq miles
- Population 29.8 million
- Borders with Thailand, Indonesia and Brunei
- Maritime borders with Singapore, Vietnam & Philippines
- Mount Kinabalu (4095m) is the highest mountain
- One of 17 megadiverse countries on Earth

HISTORY

- Formerly a British colony. Territories on Peninsular Malaysia unified as the Malayan Union in 1946.
- Restructured as Federation of Malaya in 1948.
- Gained independence in 1957 and became the Federation of Malaya.

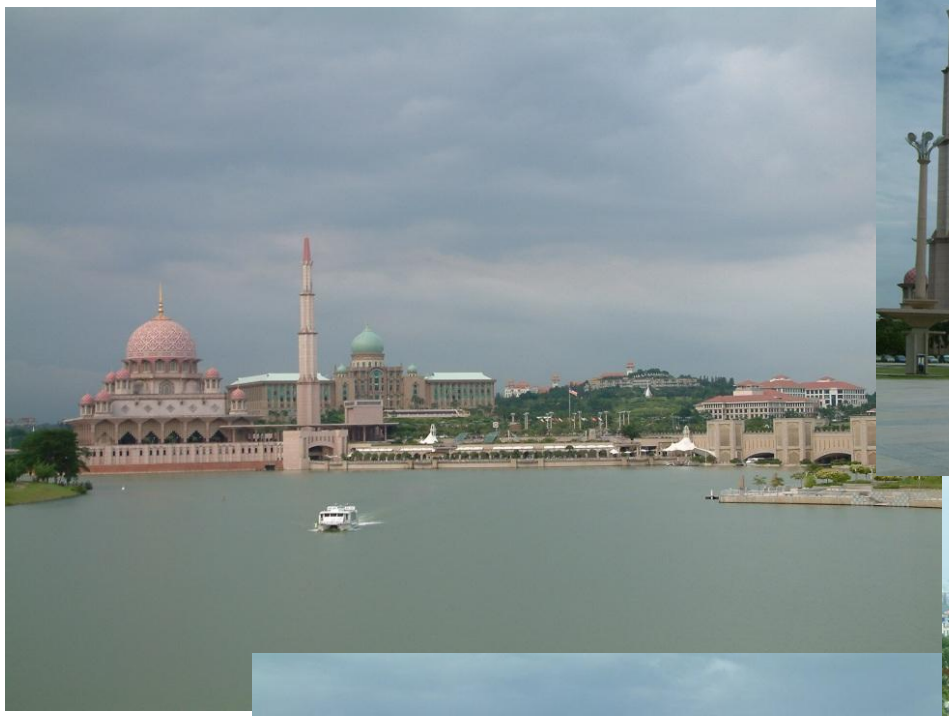
- The Federation was joined by Singapore, Sarawak, and British North Borneo (now Sabah) and became MALAYSIA in 1963.

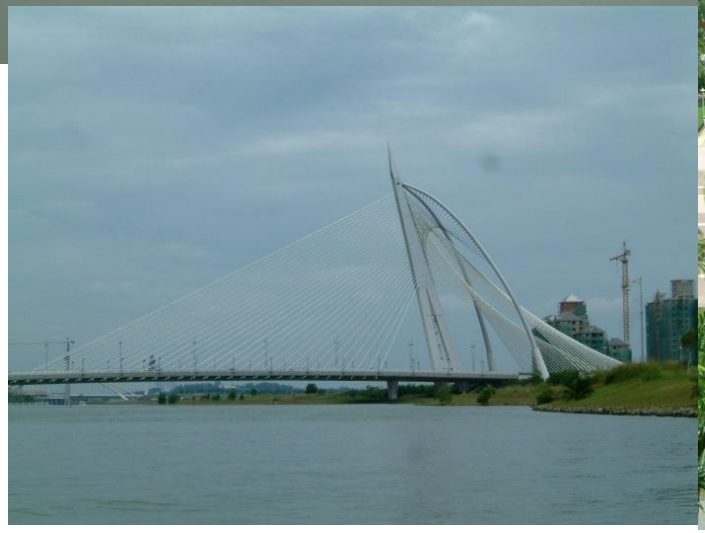
- The government was closely modelled on the Westminster Parliamentary System.
- Singapore left the Federation in 1965.

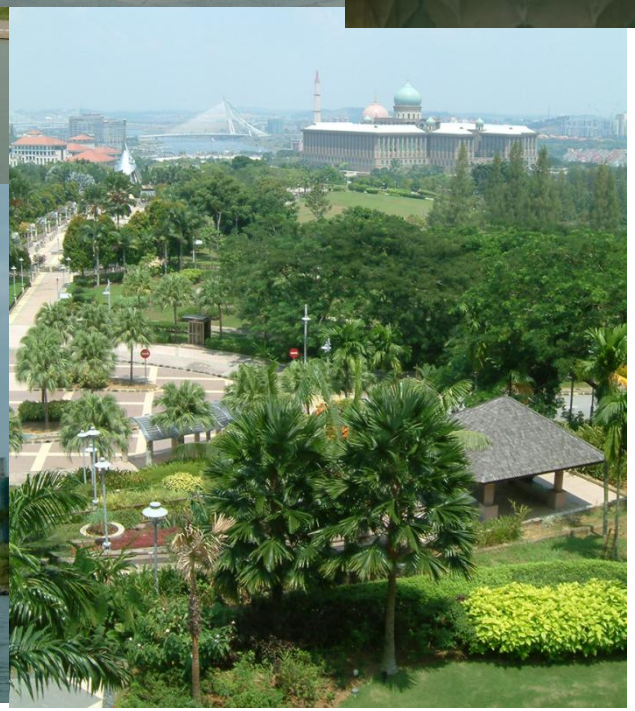
- Present parliamentary, commercial and financial capital is KUALA LUMPUR
- A new administrative capital called PUTRAJAYA has been built
- Government offices have moved there; partly to ease congestion in KL

Prime Minister's Office in Putrajaya

More views of Putrajaya







KUALA LUMPUR

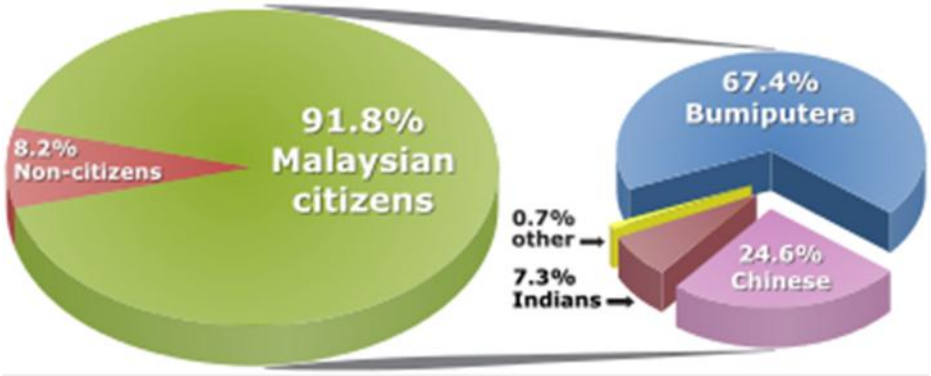
- Famous for the Petronas Twin Towers above the KLCC shopping complex

View over Merdaka square from top of Menara Tower

Contrasting residential areas

Life in the older parts of the city

PEOPLE OF MALAYSIA



- Many ethnic groups
- Malays are the majority (65%) and are Muslim
- 26% are of Chinese origin, mainly Buddhists, Taoists and some Christians.
- 8% are of Indian origin, mainly Hindu and some are Muslim

- Other tribal groups exist in east Malaysia, together they are known as Dayaks. The individual groups are the Iban, Kelabit, Kenyah, Bidayuh and Kayan.
- Orang Asli are aboriginal peoples living in Peninsular Malaysia.
- > 3 million migrant workers, many illegal, mainly from Indonesia – relied on for work in oil palm plantations and construction.

Orang Asli

Iban

ECONOMIC DEVELOPMENT

- Main exports are natural rubber, palm oil, timber, cocoa, pepper, pineapple and tobacco with some tea in the Cameron Highlands

Rubber tapping


Tea plantation in the
Cameron Highlands

Agriculture in Sarawak

Fruit and vegetables are plentiful

Industrialisation

- The emphasis has changed from mainly agriculture to manufacturing, computing and electronics
- Malaysia was one of the newly-industrialising countries known in the 1980's as the 'Asian Tigers'

Globalisation

- All the big brand names are found in the cities – some of them very familiar!

So – is Malaysia a developed country?

Several large scale projects like the KL rapid transit system, the Twin Towers, KL international airport (KLIA), Bakun hydroelectricity dam, Sempang Formula 1 circuit, the Multi-media Super Corridor (MSC) and the North-South expressway give the feeling of a developed country.

COMPARISONS

	UK	MALAYSIA	SINGAPORE
GDP per capita	$37,298	$17,526	$62,427
HDI (>0.8 = high development)	0.875	0.769 (rapid increase since 1980 largely due to increased schooling)	0.895
Population	63.7 million	29.8 million	5.4 million
Population density	255/km² 53rd of 241	86/km² 116th	7,148/km² 3rd

- On the other hand, many people still depend on agricultural crops and on fishing

•Some indigenous groups still live in the forests and along the rivers with a small number still being hunter-gatherers

Some tribes live in longhouses in Sarawak

•Travel is by boat and the longhouses are usually built by the river

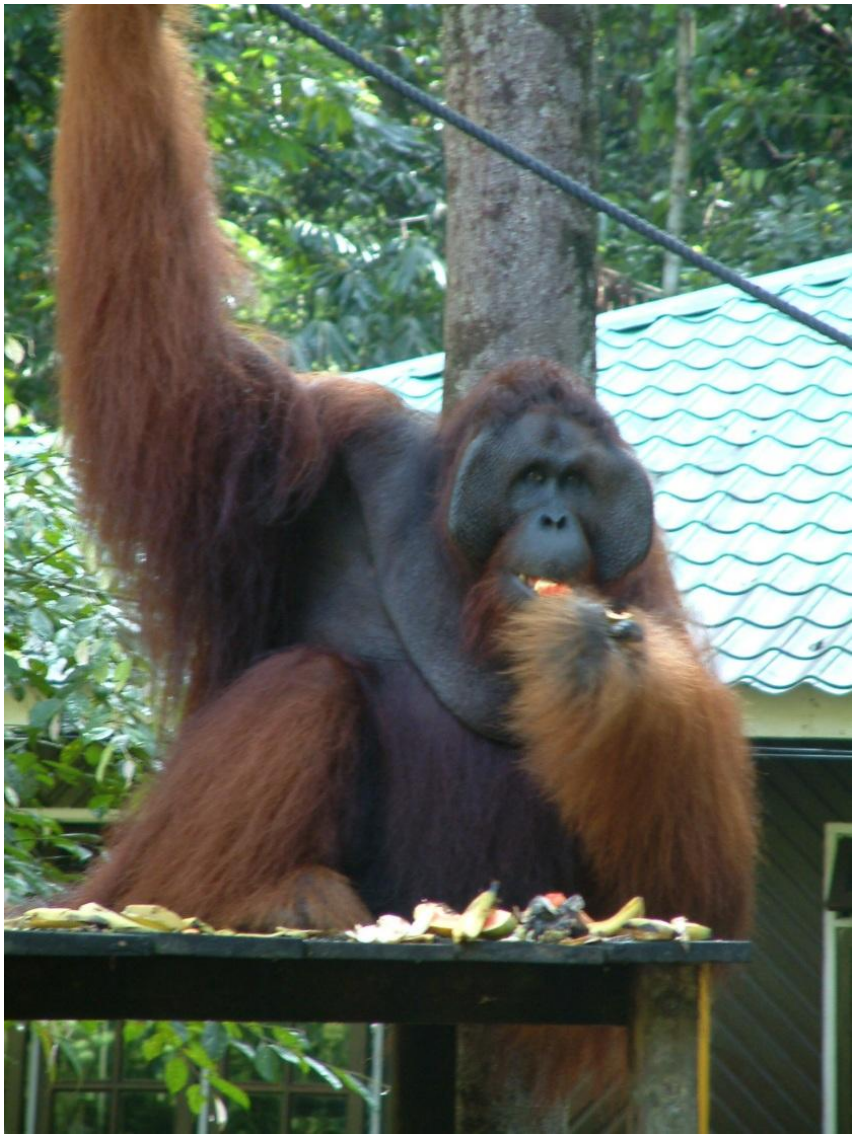
ENVIRONMENT

- Past expansion of the logging industry has caused serious problems of soil erosion
- About 57% of Malaysia remains forested
- Forests are managed sustainably

- The Government is committed to protecting the environment

- Examples are the protection of turtles; sanctuaries for orang-utangs and marine parks to prevent damage to coral reefs

Orang-Utang ‘The Man of the Forest’



Education in Malaysia

- Kindergarten - 3 to 6 yrs (mostly private)
- Primary - 7 to 12 yrs Exam at end
- Secondary * - 13 to 17 yrs Exam (=GCSE)
- Extra 1½ yrs Exam (=A2)
- University - several public (eg U. of Malaya)
  - five international (eg U. of Nottingham Malaysia Campus)

* Maths and Science are taught in English
* About 60 Chinese Independent High Schools teach mostly in Chinese
* There are four International Schools in KL

Timeline for the University of Nottingham Malaysia Campus and School of Biosciences

- Nottingham University invited to open Branch campus by Malaysian Government in 1998 - initially located in the centre of KL
- First student intake in September 2000
- Semenyih Campus officially opened in September 2005
- School of Biosciences at UNMC from March 2006
- First student intake in Biosciences in September 2006
- First Biosciences' graduates in July 2009
- Official opening of AAR-UNMC Biotechnology Research Centre in September 2009

Why develop a campus in Malaysia?

Advancements in science and technology, including Biotechnology and Agriculture, are key components in the plans of the Malaysian Government to achieve status as a developed nation by 2020.

The University has benefitted from connections with influential Malaysians – several of whom were Nottingham Alumni including:

- Prime Minister Mohd Najib Tun Abdul Razak.
- HRH Tunku Imran ibni Tuanku Ja'far, the son of the King of Malaysia.

Why take Biosciences to the Malaysia Campus?

Discussions between Jerry Roberts and Soh Aik Chin (Director of Research at AAR) led to the initial concept of a degree programme at UNMC.

In 2005, a business case was made for undergraduate and postgraduate programmes in plant and crop biotechnology at UNMC.

In March 2006, I was seconded to UNMC (initially for 2 years) to recruit staff, set up lab facilities and develop teaching and research programmes in plant and crop biotechnology.

The University of Nottingham

Malaysia Campus

Semenyih Campus Master Plan


January 2004

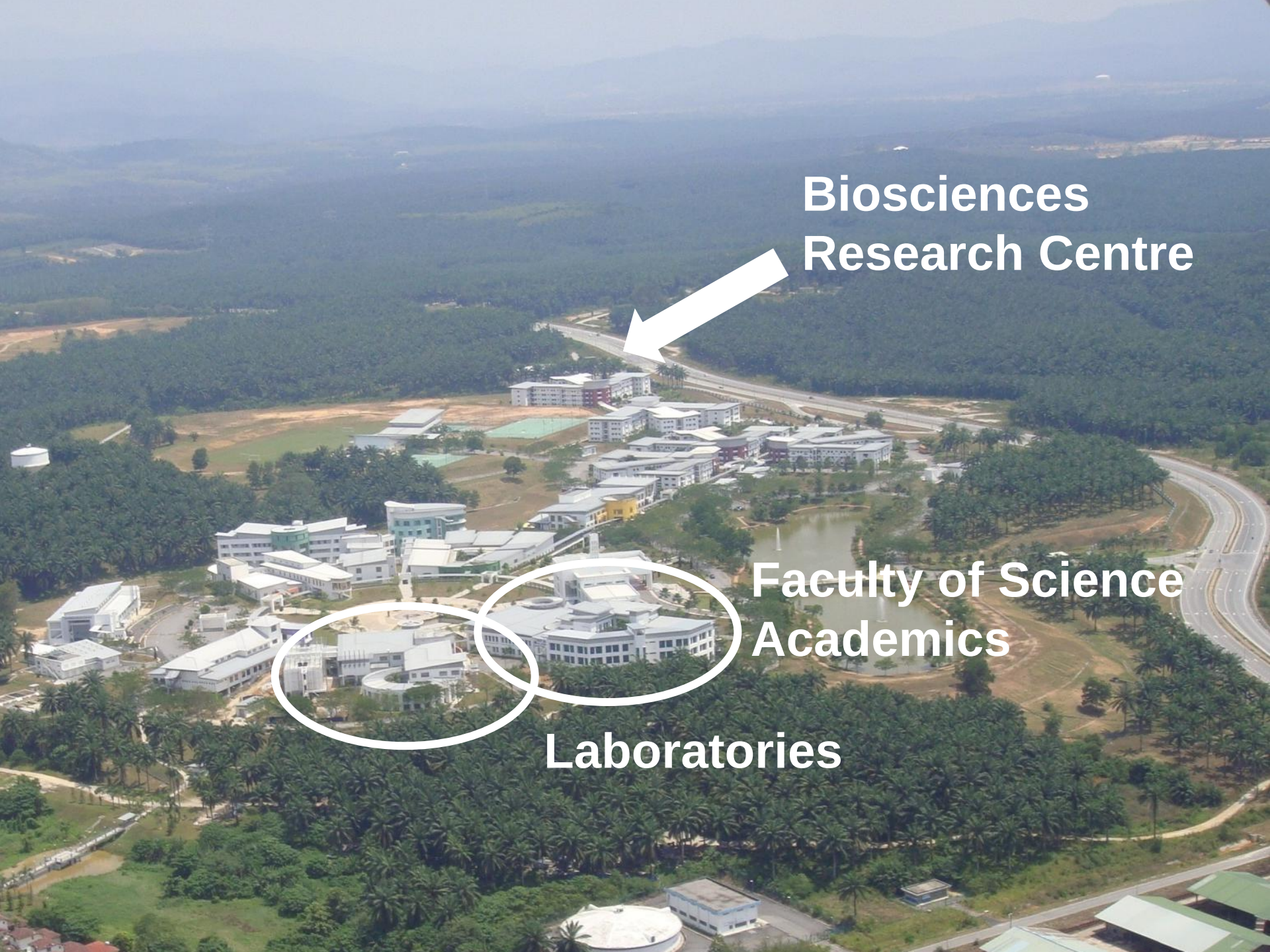

April 2005


July 2005


July 2005


2005


University of Nottingham Malaysia Campus
January 2007


Biosciences
Research Centre
Faculty of Science
Academics
Laboratories


The University of
Nottingham

Block B: Offices in Faculty of Science


The University of
Nottingham
Malaysia Campus


Admin
Great
Block
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Learning Objectives
The University of Nottingham
Malaysia Campus
1. To introduce commonly used cost terminology
2. To understand how firms historically have computed product costs
3. Reinforce how product costs affect the financial statements
4. To understand how product costs are useful to decision-making
2


Fisherbrand


PURIFIED NITROGEN

Plant shadehouse

Faculty / School Structure at UNMC

Faculty of Engineering

- Chemical & Environmental Engineering
- Civil Engineering
- Electrical and Electronic Engineering
- Mechanical, Manufacturing & Materials Engineering

Faculty of Science

- Biomedical Sciences
- Biosciences
- Computer Science
- Geography
- Pharmacy
- Psychology

Foundation

- Arts & Education
- Business & Management
- Engineering
- Science

Faculty of Arts and Social Sciences

- Applied Psychology
- Business
- Economics
- Education
- English
- Modern Languages & Cultures
- Politics, History & International Relations
- CELE
- Compulsory Subjects Unit

Biosciences academic staff in 2006

School of Biosciences

The University of Nottingham

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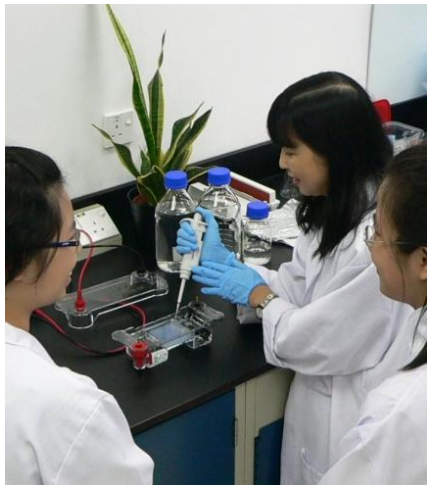
Biosciences Students in Nottingham (BSN) Club

Broga Hill challenge for visiting academics!

School of Biosciences, UNMC



Undergraduate Programmes (3 year courses)

BSc (Hons) in Biotechnology

BSc (Hons) in Plant Biotechnology

BSc (Hons) in Nutrition

BSc (Hons) in Environmental Science

School of Biosciences, UNMC

Postgraduate Programmes

- MSc Crop Biotechnology
- MSc Crop Biotechnology and Entrepreneurship
- MSc International Biosciences
- MPhil (Biosciences)
- PhD (Biosciences)

School of Biosciences

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Partnerships: Industrial and International Links

Food security, human and environmental health

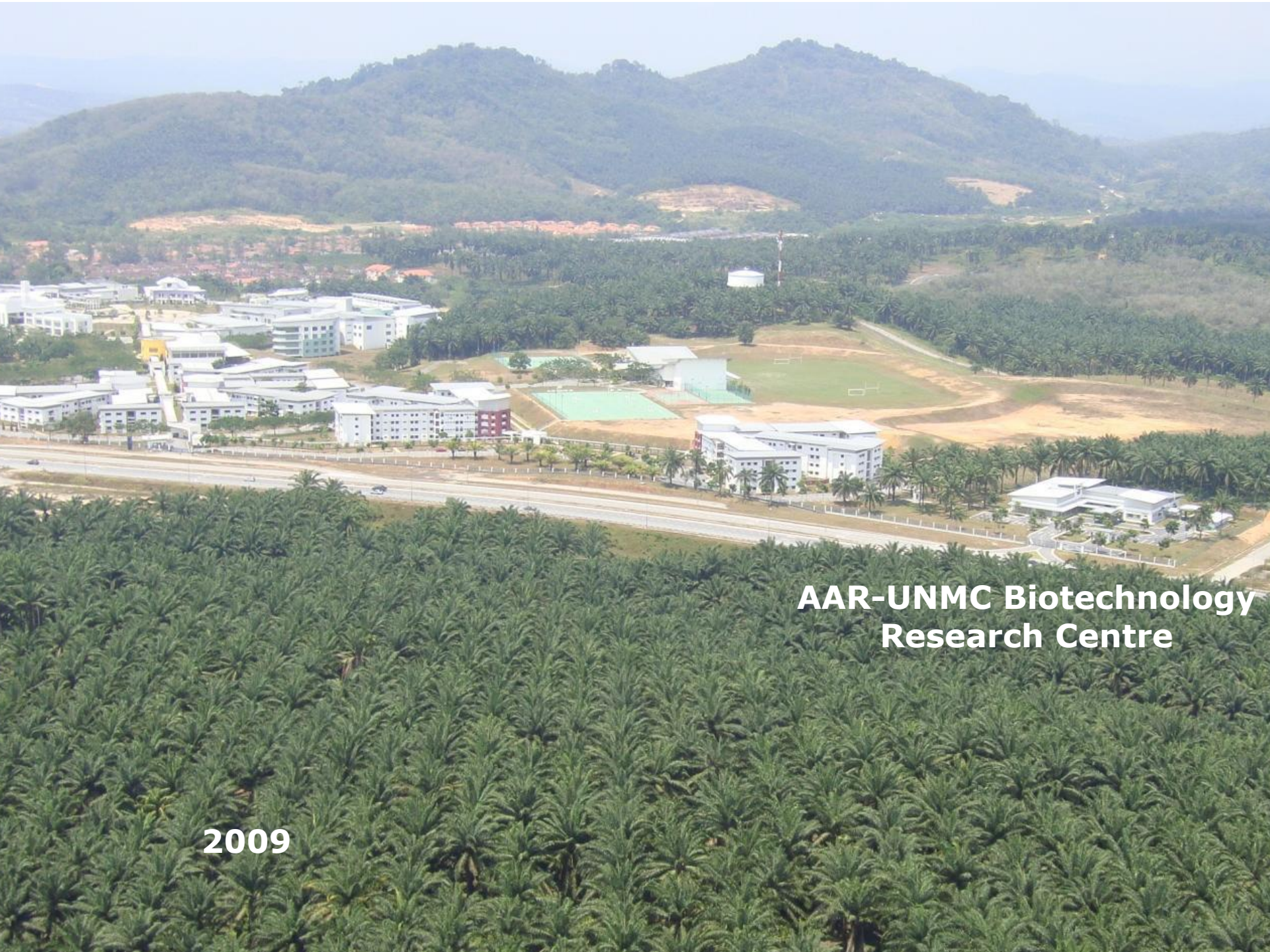
Biotechnology for the improvement of plants/crops for food, non-food and medicinal uses.

Dedication to underutilised plant species research.

Academic-industry partnership

Academic-international organization partnership

Crops For the Future
RESEARCH CENTRE


AAR-UNMC Biotechnology
Research Centre
2009

AA RESOURCES

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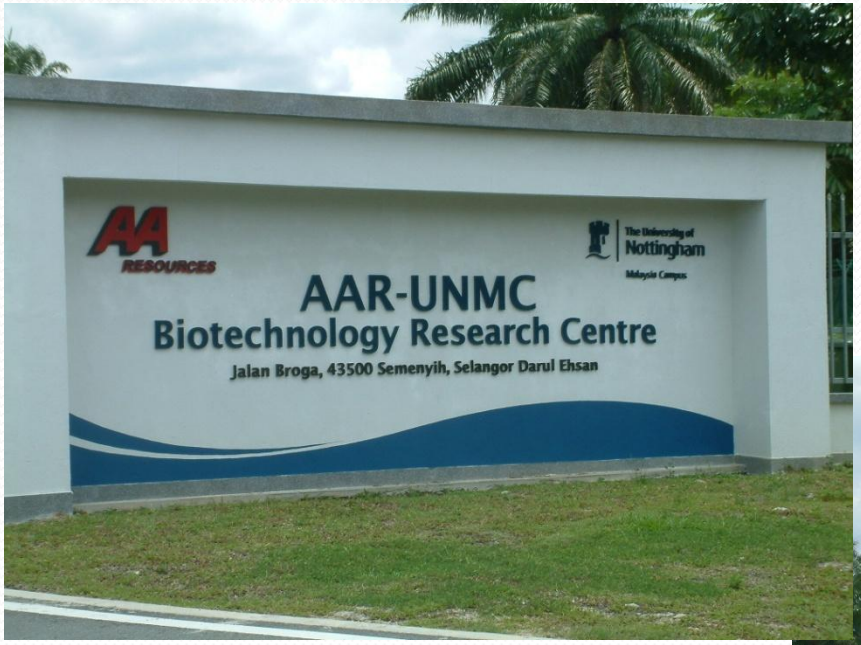


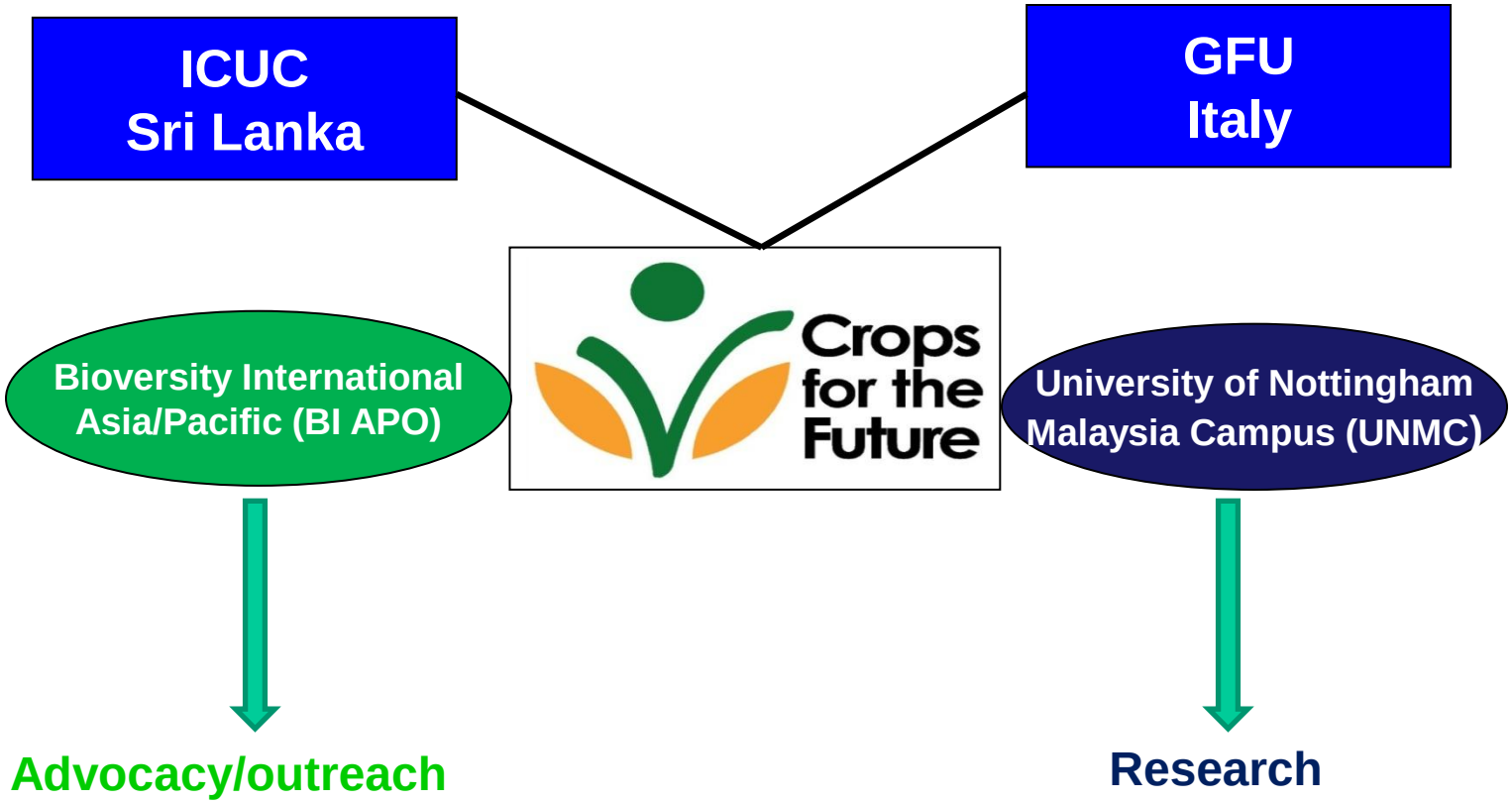
The Applied Agricultural Resources (AAR) and the University of Nottingham Malaysia Campus (UNMC) Biotechnology Research Centre was opened in April 2008 to expedite oil palm genetic improvement through modern biotechnological approaches capitalizing on UNMC expertise in this field.

The Research Centre contains excellent facilities for teaching and research in the areas of plant tissue culture and molecular biology and is used for research on major crops, such as oil palm, and on underutilised crops.


TECHNICAL SUPPORT HOTLINE


Alpha
Innotech

Crops for the Future (CFF):
Global alliance for underutilised crops



Any food or non-food crop not already supported by international centres

Key contributions

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Nottingham academics receive Queen's Award at Buckingham Palace

Professor Greenaway received the prize from Her Majesty the Queen and said:

*"We are extremely honoured and proud to have received this award for our work in the area of global food security. It recognises the important contribution the University is making to this vital area of research at our UK and **Malaysia** campuses"*.

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Yang Amat Berhormat Dato' Sri Mohd Najib Bin Tun Haji Abdul Razak, the Prime Minister of Malaysia, extending a warm welcome to symposium participants during the official opening ceremony. He also officially launched Crops for the Future Research Centre.

Symposium participants outside the main symposium hall at the Royale Chulan, Kuala Lumpur, Malaysia.

MPhil / PhD: in many different fields of **Biosciences**

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BIOTECHNOLOGY AND BREEDING

- Molecular markers for crop improvement
- Embryogenesis
- Fruit ripening in oil palm
- Tissue culture and genetic transformation
- Genetic fidelity

CROP PHYSIOLOGY

- Photosynthesis research
- Drought resistance in crop plants
- Crop mineral nutrition

BIOTIC STRESS

- Oil palm *Ganoderma* research
- Plant-pathogen interactions
- Molecular pathology
- Epidemiology and diagnostic studies
- Bio-control agents

ENVIRONMENTAL SCIENCE

- Aquatic ecology
- Conservation ecology
- Sustainable agro-ecosystems
- Remote sensing

MPhil / PhD: in many different fields of **Biosciences**

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Mangosteen

NUTRITIONAL SCIENCES

- Probiotic and prebiotic
- Antioxidant capacities
- Nutrikinetics
- Nutritional properties
- Bioavailability

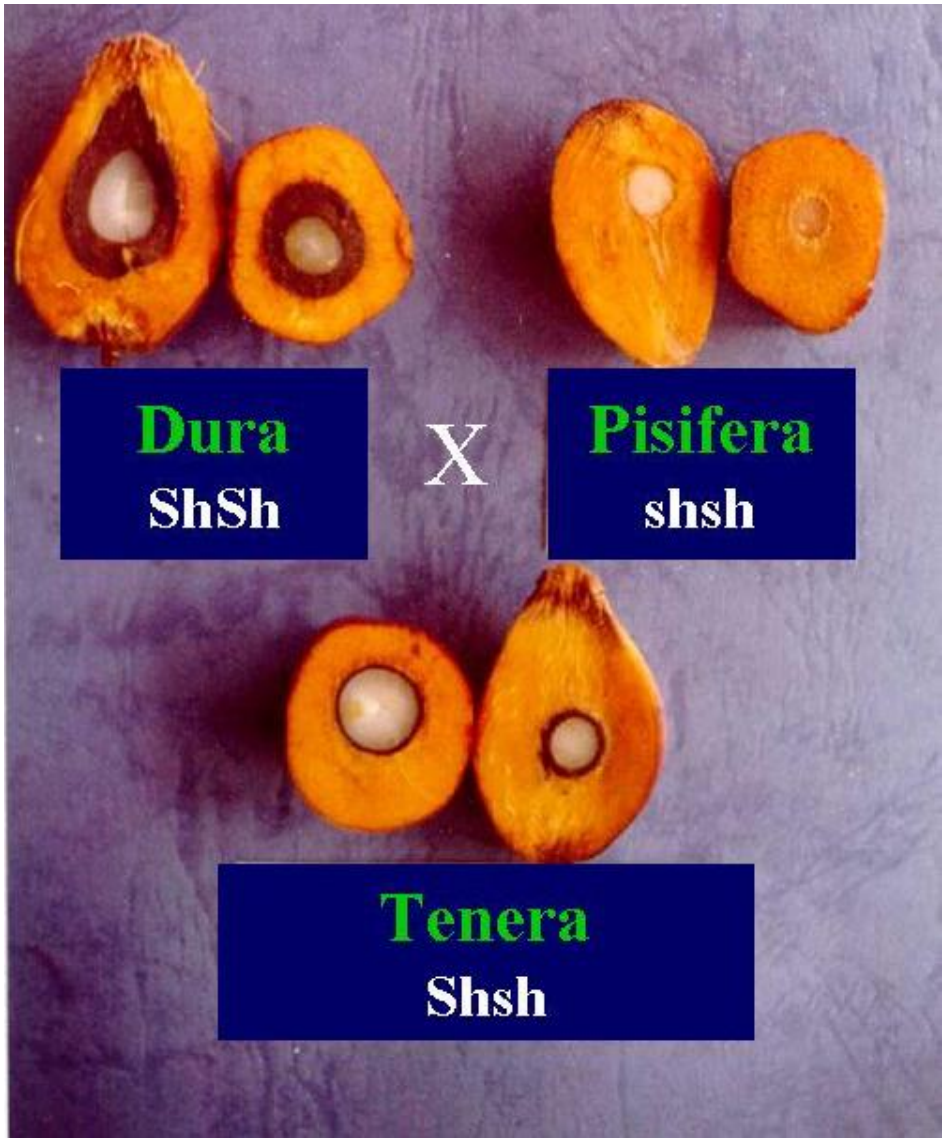
BIO-PHARMING AND NATURAL PRODUCTS

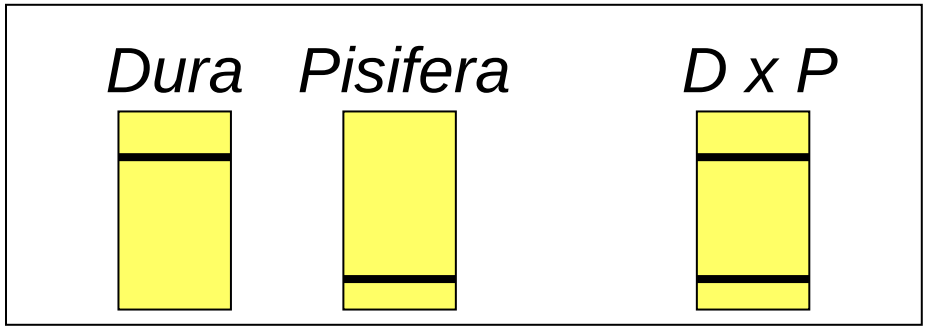
- Gene expression in various systems e.g. plants
- Plant-based vaccine development
- Plant secondary metabolites

Students benefit from close interaction that exists between the Malaysia Campus and the School of Biosciences in the UK.

Diagnostic tool for shell thickness gene in oil palm
– new strategies –

AAR/UNMC –research collaboration

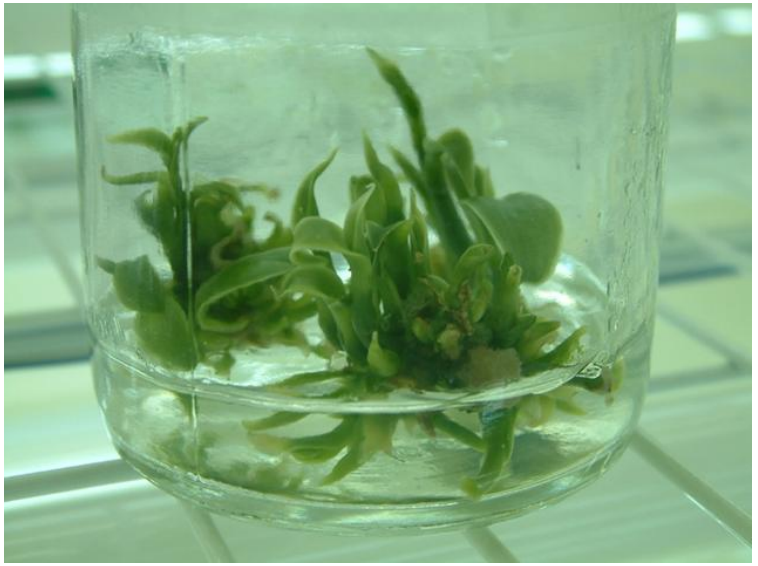




Extending the post-harvest life of tropical fruits

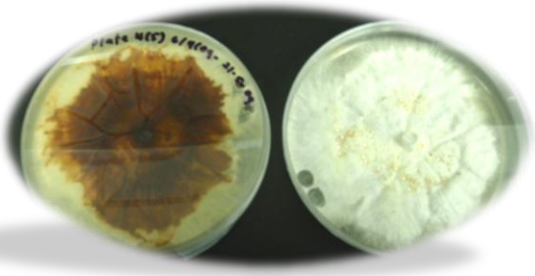
Novel Edible Coating for Tropical Fruits as an Alternative to Synthetic Fungicide

Tissue culture technology for plant propagation and germplasm improvement



Vanilla planifolia

Biology and control of *Ganoderma* in oil palm



Pharmacological Characterization of Bioactive Compounds from Rainforest Plants for the Development of Therapeutic Agents

Collection of rainforest (tropical) plants
Metabolite extraction
Pharmacological characterization at various biological and chemical levels
Anticancer, antibacterial, antioxidant, antiviral, immunomodulating activities
Identification of novel bioactive compounds for future therapeutic applications

Plant Collection Ethnopharmacological Identification Herbarium

So – what else is there to do in Malaysia?

Visit historic places such as Malacca

Go scuba diving and snorkelling

Admire Malaysia's beautiful flora

Taste some tropical fruits

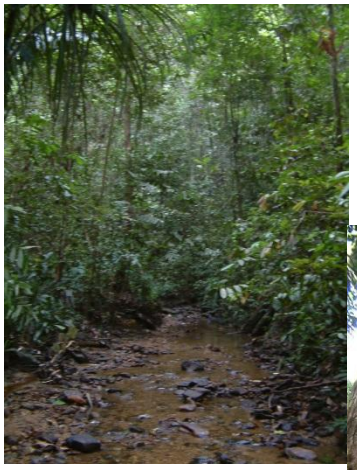
Jackfruit

Longan

Durian

Check out the wildlife!

Take a walk in the rainforest -



- dressed like this in case of leeches.

Shopping is said to be a Malaysian pastime – there's plenty of variety!

Ubiquitous roadside stalls

…… with amazing foods!

Colourful night markets

Intriguing day markets


ABC

Eating out is popular – and inexpensive – but beware the chilis!

Quite a choice of things to do but sometimes its good to swim in warm seas or just relax on a beach.

You can also cool down by visiting Cameron Highlands

……. or watching the sun go down!

In conclusion – what have been the challenges, achievements and opportunities in taking Biosciences to Malaysia?

Challenges:

- To set up robust teaching programmes covering diverse topics with a small team of academic staff.
- To set up laboratories to cover practical elements and provide facilities for research projects.
- To establish credibility with UK colleagues and with other institutions in Malaysia.
- To convert students from background of wrote learning to critically appraise the work of others.
- Achieve financial viability.
- To maintain lead over UK institutions now entering Malaysia.

Achievements:

- Established four BSc programmes with combined intakes of ~70 students per year.
- Established sound research base with 37 PhD students and links with Malaysian institutions.
- Provided Biosciences base for successful bid by University for Crops for the Future Research Centre.

Opportunities:

- Research in the area of global food security.
- Research links with CFFRC.
- Research links with other Schools at UNMC, including Pharmacy and Engineering.
- Links with Indonesia and Myanmar.

Terima kasih

Any questions?