



UNIVERSITI TEKNOLOGI BRUNEI

GRADUATE RESEARCH TOPICS

Universiti Teknologi Brunei (UTB) offers graduate research programmes leading to MSc and PhD degrees. All research degree applicants usually are free to choose a supervisor and propose research topics upon applying to UTB.

UTB academic staff also offer research interests/topics which a student may wish to consider. Students are encouraged to study the profile pages of UTB staff through the UTB website before making commitments.

Students may also wish to communicate directly with a potential UTB academic staff to obtain further information prior to submitting applications as well as tentative research topics/proposals.

The followings are-research topics offered by UTB staff.

Faculty of Engineering

Civil Engineering

Academic Staff: <http://www.utb.edu.bn/academics/faculty-of-engineering/people/>

No.	Lecturer	Research Topic	Brief Description	Level
1	Lim Pang Jen	Retrofitting of reinforced concrete building joints with fibre-reinforced polymer.	The aim is to tackle all the practical issues with this form of retrofitting, such as the presence of cross-beams, floors, walls, columns wider than the retrofitted beam, etc. that can complicate the anchorage of the FRP.	MSc/PhD

2	Hj Asari Hj Abd Rashid	Intelligent Control of Seawater Intrusion to Marine Diffusers	Marine diffusers are widely used to discharge wastewater into the deep sea in order to protect coastal water quality, as is practised in UK, US, Australia, China etc. and also BSP in Brunei. The diffusers are prone to seawater intrusion due to change of wastewater discharge, sea level, waves and so on, causing block and malfunction of the facility. This project is to develop a numerical model for simulation of seawater intrusion and purging process and mechanism. Accordingly a software will be developed in parallel to intelligently control operation of the system so as to avoid the seawater intrusion.	MSc/PhD
3	Shahriar Shams	Reliability Analysis of Urban Rainwater Harvesting Systems	For reliable rain water harvesting (RWH) systems, the storage volume must be assessed carefully in order to meet the year-long demand of a family. Mass curve techniques based on daily water demand and rainwater supply will be used to develop the design curves for storage volume calculation. A good knowledge about hydrology is essential.	MSc
4	Shahriar Shams	Challenges and Opportunities of Recycling in Brunei Darussalam	This project looks at the existing recycling facilities, identify gaps and challenges of recycling in Brunei Darussalam. Recommend measures that will lead to potential investment and job opportunities contributing to clean environment. The study will look at various recycling methods based on the characteristics of waste stream. A sound knowledge on Solid Waste Management is preferred.	PhD
5	Shahriar Shams	Development of Smart Underground Artificial Water Storage (SUAWS) in tropical climate	This project looks at the at different underground artificial water storage facilities. Make comparison of existing underground artificial water storage facilities with strength and weakness of each identified. Propose and develop a design to overcome the weakness of underground artificial water storage using smart technologies which is adoptable and sustainable both in terms of water quantity and quality under tropical climate. A good knowledge about hydrology and hydraulics is essential.	PhD
6	Shahriar Shams	Assessment of Open-Source software for Water Resources Management	This project looks at potential software that are available in the market for water resources development. A number of screening criteria will be used for short listing the potential software and they will be further ranked. A good computing background is essential with knowledge of open-source software.	MSc
7	Dr Yap Yok Hoe	Highway and Traffic Engineering	Any suitable project involving traffic and highway engineering, which may include junction optimisation, traffic safety, microscopic simulation modelling.	MSc/PhD

8	Motiar Rahman	Sustainable construction and Green building	I am interested to work both in implementing the concepts of sustainable construction and green building (e.g. as a policy issue like motivations, issues and barriers, strategies, studying national energy / electricity consumption, energy policy, etc., or investigating smaller issues/ areas under the concepts, e.g. investigating pollution from construction, carbon emission, passive design, building energy analysis, design strategies, greening existing buildings, whole life analysis, sustainability assessment, etc.	MSc/PhD
9	Motiar Rahman	Procurement and Integration	Issues relating to design of procurement strategies, with a focus of integrating different parties to work together, i.e. collaborative working arrangements, as in partnering, alliancing, JVs, integrated project delivery, etc. It will be interesting to work in applying innovation in traditional procurement approaches, sustainability in innovative procurement approaches, etc. This also includes issues like time/ cost overrun, claims, and risk management, especially Joint Risk Management.	MSc/PhD
10	Motiar Rahman	Innovative techniques in construction	This includes: (1) Building Information Modelling - application, benefits, drawbacks, cultural issues, whole life assessment, whole life energy / carbon estimations, design strategies, etc., (2) MMC (Modern Methods of Construction) of off-site construction, their application, benefits, barriers, interactions / applications with BIM (e.g. estimation / reduction of waste, carbon emission, energy use, etc.), and (3) Lean Construction - application, benefits drawbacks, VSM, estimating savings, reduction of waste, etc.	MSc/PhD
11	Motiar Rahman	Construction Industry Development	This includes corporate issues like strategic management in construction, decision making process, culture in construction, impact of organisation structure on construction project delivery.	MSc/PhD
12	Pg Dr Saiful Baharin bin Pg Duraman	Durability Performance of Alternative Concrete Systems Exposed to Sulphate Attack	This project aims to investigate the performance of concretes incorporated with less-commonly utilised cement and/or aggregate replacements exposed to a common concrete deterioration mechanism- sulphate attack. Applicants should have an adequate understanding of concrete as a construction material. Knowledge in engineering materials and materials chemistry would be advantageous.	MSc/PhD

Electrical Engineering

No.	Lecturer	Research Topic	Brief Description	Level
1	Mohammad Rakib Uddin	Digital Photonics/Fiber Optics	<p>Future communication and computation problems are unavoidable since conventional electronics technology will very soon reach its ultimate capacity limit. Therefore, a drastic solution to the problem is needed, and unless we adjust our thoughts to a totally different direction from the conventional electronics, we will not be able to further improve our communication and computation performances for the future. Optical circuits and systems are strongly believed to be the most feasible technology that can provide the solution to the extreme limitations imposed on the capacity, speed and complexity of present day computations by conventional electronics. Optical devices have been incorporated into many and proved to be reliable and more advantageous. Optics provides higher bandwidth than electronics, which enables more information to be carried simultaneously and data to be processed. Optical signals in waveguides, fibers, and circuits do not have to charge a capacitor and are therefore faster. The photon can cross each other without interference, and are not affected to space radiation. Such advantages of optical data processing are of extreme interest to the future communication and computation systems.</p>	MSc/PhD
2	Mohammad Rakib Uddin	Photonics/Fiber Sensors	<p>Photonics/Fiber Optics has been considered the latest technology as it uses light properties. With the use of photonics/Fiber optics, systems can work more effectively at much greater speed and information capacity. Photonics devices have been incorporated into many different systems and have proven to be reliable and offer better benefits. Photonics devices have attracted immense attention due to its potential to provide greater sensitivity while being robust against electromagnetic interferences as it uses light to transfer information. Other than that, they are small and low weight as silicon is a low-density element. They have the capability to provide a low-cost sensing solution.</p>	MSc/PhD
3	Mohammad Rakib Uddin	Photovoltaic (Optical to electrical) energy harvest optimization	<p>Design, simulate and experimentation of photovoltaic energy system to optimize energy harvest using light intensity tracing and fresnel lense incorporation.</p>	MSc
4	Mohammad Rakib Uddin	Smart Agriculture	<p>Indoor, multilevel solar powered smart farming</p>	MSc

5	Kenneth S. K. Yeo	RF Energy Harvesting	The demand of mobile communications has increased very rapidly in recent years. To meet the growing demand, more and more mobile cellular towers are erected across the globe. As a result, RF energy sources are widely available in the atmosphere. This project is to research on new ideas in harvesting this RF energy to power essential electronic devices, i.e. street lights, outdoor night lights, body sensor network, etc.	MSc/PhD
6	Kenneth S. K. Yeo	Microwave Filter Design using Substrate Integrated Waveguide (SIW)	Microwave filter is one of the essential components in wireless and mobile communications. This research work is to design and develop novel microwave filters using SIW.	MSc/PhD
7	Kenneth S. K. Yeo	Microwave Filtenna Design using Substrate Integrated Waveguide (SIW)	In wireless communication front end, the antenna is used for transmitting or receiving the electromagnetic energies and the filter is used for selecting (or isolating) the frequency bands of the electromagnetic spectrum. This project is to investigate on the integration of the antenna and the filter to develop a filtered antenna which is also known as a filtenna. SIW will be used to develop this technology in this project.	MSc/PhD
8	Ang Swee Peng	Mathematical Modelling of Power Transformer for Ferroresonance Phenomenon	The initiation of a ferroresonance phenomenon in power systems is commonly caused by the reconfiguration of a power network into a ferroresonance circuit consisting of capacitances in series and interacting with transformers under light load or no-load condition. The reconfiguration can be due to switching operations of de-energisation or the occurrence of a fault. Sustained ferroresonance is considered to be the most severe with its onset could result excessive voltage impacted upon the terminal of the affected transformer. If this phenomenon is allowed to persist without immediate mitigation measures then this could result the transformers to stay in a state of saturation leading to excessive flux migrating to transformer tanks via internal accessories. The symptom of such an event can be unwanted humming noises being generated but the real threatening implication is the possible overheating which can result in premature ageing and failures. Ferroresonance is non-linear behaviour and its onset can of several resonance responses is random. There are four different types of steady-state responses a ferroresonance circuit can possibly have: they are the fundamental mode, subharmonic mode, quasi-periodic mode and chaotic mode. Due to its random nature therefore the main objectives of this project is to mathematically model a ferroresonance circuit and also to determine how the initiation of ferroresonance modes could possibly occur.	PhD

9	Ang Swee Peng	Modelling of High Frequency Distributed Parameter Network of Power Transformer using Frequency Response Analysis (FRA) Characteristics	In power industries, the way to test the mechanical integrity of transformer cores, windings, and press frames, in power transformers is using Frequency response analysis (FRA). Every power transformer consists of a unique frequency response what we called "fingerprint". Power transformer faults or vibrations after transportation could possibly cause changes in this frequency response. Comparing the FRA measurements between the former fingerprint and the one after transportation of the same transformer can be employed in providing indications of any mechanical or electrical changes. The main objectives of this project is to model the high frequency distributed parameters circuit of power transformer which consists of R, L and C using the Power Transformer FRA characteristic.	MSc
10	Ashraf Fathi Khalil	A New Method for Delay Margin Computation in Time Delay Systems	The methods of time delay estimation reported in the literature are classified into time domain and frequency domain methods. The time domain methods are based on Lyapunov-Krasovskii stability theorem and the Razumikhin theorem. These methods are very difficult to be applied in practice. The research will focus on developing a new method for delay margin computation. The method will be tested on a practical system consists of DC motor with time delay in the feedback.	MSc/PhD
11	Ashraf Fathi Khalil	Investigation of the Electricity Costumer Behaviour in Brunei	The efficiency of the power system is a crucial point for a sustainable energy system. The electricity in Brunei is heavily consumed in the residential sector. The main focus of the research is to investigate the electrical loads in the houses of Brunei.	MSc
12	Ashraf Fathi Khalil	Stability and Stabilization of Time delay Control Systems with Application to MicroGrids and SmartGrid	In distributed energy systems such as Microgrids the control signals are proposed to be exchanged through communication networks. These communication networks are characterized by time-varying, random delay and data loss. The networks used are the Ethernet, the wireless networks and the Internet. These networks are characterized by random delay and data loss. The aim of the research is to develop a control method to stabilize the system, case study could be Microgrid, or smart grid.	PhD
13	Ashraf Fathi Khalil	The Impact of the Communication Delay on the Power System Stability	The deregulation of the electricity market made the open communication infrastructure an exigent need for future power systems. The open communication is characterized by time-varying delay. The research topic will focus on the stability analysis of load frequency control system or singl-machine-infinite-bus power system	MSc/PhD

14	Ashraf Fathi Khalil	Prospects of the Solar Energy in Brunei	Brunei is one of the countries blessed with high potential of solar and wind energy. Brunei currently produces its electricity needs from fossil fuel which is depleted and harmful to the environment. The demand on energy will substantially increase in the near future. This will lead to more consumption of oil and gas, which causes a reduction in the national economical revenue and more carbon dioxide emission. Therefore, Brunei should use its alternative energy supplies to cover some of its load requirements. The current research is to investigate the technical and economic feasibility of solar energy (mainly Photovoltaic) in Brunei. Challenges and obstacles faced by the solar energy sector in Brunei are discussed and the recommendations for promoting the solar energy in Brunei are investigated.	MSc/PhD
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Mechanical Engineering

No.	Lecturer	Research Topic	Brief Description	Level
1	Yulfian Aminanda	Investigation on cylindrical tube array as impact absorber structure for crash barrier application	The project will investigate the energy capability of an array of hollow structure in absorbing certain energy impact loading. Upon validation, the parameters study will be performed using FEA simulation to determine the optimum configuration of structure in absorbing a prescribed impact loading. The optimum configuration will be assembled to its support to construct a crash barrier structure. The investigation continues to determine the optimum hollow-support structure configuration by observing the total absorbed energy and its distribution to hollow and support structure. The crash barrier will be subjected to frontal and oblique loading and the failure mechanism will be investigated to fulfil the deformation requirements of a car barrier structure.	PhD
2	Yulfian Aminanda	Hybrid natural fiber - metal laminate composite structure for car bumper application	The project will investigate the strength of hybrid natural fibre-metal laminate in absorbing the energy impact. Different configuration of flat and standard specimen of hybrid laminate; its stacking sequence, number of layer will be studied using, upon validation, FE Simulation. Once the optimum configuration is identified, the development of simulation using car bumper model will be performed. At this stage, the investigation focuses on the effect of bumper geometry. The FEA will be computed for several geometry and the optimum of bumper design in terms of its maximum specific energy absorption capability will be proposed.	PhD

3	Yulfian Aminanda	Investigation of Carbon fibre-Metal Hybrid laminate composite structure for fuselage skin application	The project proposes to investigate additional metal layers on carbon epoxy laminate composite for fuselage skin application. The additional metal layer will increase the strength of metal-carbon fiber laminate subjected to moisture absorption but in the same time will increase the total weight of skin. Therefore, it is interesting to study the effect of metal skin layers in hybrid metal-carbon fibre laminate in term of its trend in term of its mechanical strength, moisture insulation, weight and cost. The mechanical behaviour of hybrid structure will be investigated using FEA simulation in term of its strength under uniform pressure and 3 bending point. The effect of number of layers, stacking sequence of carbon layers and the thickness of each layers will be investigated to determine the optimum configuration. With the optimum configuration, The effect of geometry, i.e. fuselage skin shape, will be investigated as well.	PhD
4	Zuruzi Abu Samah	Exploration of natural resources such as plants, sea shells for advanced applications	This research aims to harvest natural materials such as plants as key ingredients in advanced materials. This research identifies key applications and focus on developing natural materials as alternatives. Example include harvesting bamboo for fibres and sea shells for fillers as reinforcements in advanced composites.	MSc/PhD
5	Zuruzi Abu Samah	Development of porous materials such as polydimethylsiloxane (PDMS) for applications in environment and energy applications	This research aims to develop engineered PDMS foams as a key material for various applications. Applications includes oil water separation and energy generation. We aim to achieve this by engineering architecture of foams through composite generation and modulating void parameters.	MSc/PhD
6	Zuruzi Abu Samah	Learning from nature: Taking a leaf from plants and animals	This research aims to understand natural phenomena and events from a scientific perspective. It aims to study events such as how plants attach themselves to others and how its roots respond to presence of nutrients and other analyses. Complex natural events are modelled by developing engineered platforms to understand effects of various factors.	MSc/PhD
7	Naseem Uddin	Investigation on influence of extra strains in flow on heat transfer	This project investigates the role of extra strains in flow on heat transfer. Extra strain in flow develops due to separation, reattachment, impingement etc and such flows as classified as complex flows. The study involves simulation in both commercial and non-commercial CFD codes. For comparison the data sets from ERCOFTAC will be used. Candidate id expected to be familiar with computer programming.	PhD

8	Naseem Uddin	Harnessing Ocean Energy from the shore of Brunei	The goal of this project is to investigate the ocean currents near coastline of Brunei to harness ocean energy. The wave pattern will be investigated and Gorlov Turbine power predictions will be assessed. The work will involve experimental rig development.	PhD
9	Naseem Uddin	Numerical Simulation of Supersonic Flow over Cone/Wedge and comparison with Experimental data	The goal of this project is to assess the capability of different codes to predict the benchmark case of flow over cone at different cone angles and compared that open results in open literature. Simulations would be conducted in both commercial and non-commercial CFD codes. Knowledge of C++ is desirable.	MSc
10	Naseem Uddin	Investigations on the design of floating river-cleaning device	In this project different design of river-cleaning devices will be numerically investigated. The multiphase/free surface waves simulation will be conducted to explore the best design suitable for Brunei rivers.	MSc
11	Naseem Uddin	Numerical simulation of Tsunami wave propagation in South-China Sea	The goal of this project is to numerically solve Hyperbolic-wave equations and estimate the travel time of Tsunami wave and its amplitude in South-China Sea. The Knowledge of C++ is required.	MSc
12	Ardeshir Bahreininejad	Development of new/hybrid optimisation methods for optimal modelling, design and simulation	The objective of the research is to develop new/hybrid efficient optimisation algorithms for the optimal modelling, design and simulation of mechanical and structural problems.	PhD
13	Ardeshir Bahreininejad	Path planning and trajectory optimisation for intelligent unmanned aerial vehicle	Autonomous robots and vehicles have been used to perform missions in hazardous environments, such as operations in nuclear power plants, exploration of Mars, and surveillance of enemy forces in the battle field. Among these applications is the development of more intelligent unmanned aerial vehicles (UAVs). One of main challenges for intelligent UAV development is path planning in adversarial environments. In the UAV path planning problem in adversarial environments, the objective is to complete the given mission – to arrive at the given target within a pre-specified time while maximizing the safety of the UAVs. The adversaries can be considered as obstacles. The main difference between robot path planning and UAV path planning is that a UAV must maintain its velocity above a minimum velocity, which implies that it cannot follow a path with sharp turns or vertices. The objective of this research is to develop efficient algorithms for optimal autonomous UAV path planning.	MSc

14	Roslyna Rosli	Hydrodynamic design of a tidal turbine for low resource deployment in the South China Sea	The research looks into the development of a tidal turbine design that are suitable for deployment in low tidal current such as in the region in South East Asia. Design of turbines could be taken from enhancing existing turbines or new turbine design could be produced. The hydrodynamic operation and performance of the turbine is to be considered as well to further develop it into a complete water to wire system.	PhD
15	Roslyna Rosli	Potential and challenges of renewable energy generation in Brunei Darussalam	Is Brunei ready for an energy transition from fossil fuel to renewable? The research considers the potential renewable energy resources i.e. solar, marine energy and biomass that are suitable for Brunei Darussalam. It considers the resource available as well as the environmental and economic benefit and challenges of introducing RE power generation in a heavily dependent fossil fuel industry.	PhD

Petroleum and Chemical Engineering

No.	Lecturer	Research Topic	Brief Description	Level
1	Reddy Prasad	Generate process steam using solar thermal energy	The steam produced from this research has many uses like in big hospitals, big hostels, hotels, army establishment and also for desalination. A lot of steam required for enhanced oil recovery can be generated on site. For continuous steam supply adds research components for solar heat storage. It can gain a lot of carbon credit and no recurring expenditure for energy bill.	MSc/PhD
2	Reddy Prasad	Production of Hydrogen by solar thermal cracking of hydrocarbons	All hydrogen requirements can come from an oil rich country without a cap on their oil production. Cracking of hydrocarbon using solar heat results in hydrogen and marketable carbon. No separation problem and no CO2 Pollution	MSc/PhD
3	Reddy Prasad	CO2 capturing and storage using solar thermal energy	Carbon capturing and storage (CCS) is one of the important for the environmental protection. Solar thermal energy as energy source for conducting the unit operation.	MSc/PhD

4	Maziyar Sabet	The Effect of Pressure Changes in Production of Graphene Using Plasma Enhanced Chemical Vapour Deposition (PECVD)	Graphene has emerged as a remarkable and one of the most promising substance that has getting a lot of appreciable attention with a multitude of astonishing properties. This research focuses on the features of the plasma-enhanced graphene production techniques. The deposition at a lower temperature happens, in the existence of plasma, when a gas or liquid precursor is introduced into the chamber to create the desired thin films on the substrate. Before that, it is transported to vacuum chamber to get processed in order to maintain purity of the equipment and to ensure the presence of gas molecules and impurities are smaller. Plasma enhancement is essential for depositions to occur at low temperatures. Having the plasma at different pressure chamber has become an area of interest in this utilization of plasma-enhanced method.	MSc
5	Maziyar Sabet	Production of Graphene via Plasma Chemical Vapour Deposition through temperature change	Currently, research on the production of Graphene is still in progress. Although numerous experiments and research have been done aspects of what variables that increase the success of the widespread production of Graphene is has not been addressed. Thus through this experiment, one variable which is temperature change for the chamber will be an aspect that is focused on this research in order to prove what are the characteristics that hold the key to its cost-effective and scalable production. Plasma-enhanced chemical vapour deposition (PECVD) has been a widely known technique which functions to produce thin films such as graphene. Comparing to chemical vapour deposition (CVD), PECVD has been acknowledged that it has capabilities to operate at lower temperatures than CVD. Therefore, this feature shortens the process time of fabrication of graphene and also reduces the usage of energy. Hence due to the factor, Plasma-enhanced CVD has the potential to be an industrial scalable production of graphene. Methods such as electron microscopy (TEM, SEM, and EM) techniques will be done after performing Raman Spectroscopy (RS). The methods stated are used to characterize the graphene that has been fabricated for each test runs.	MSc

6	Maziyar Sabet	Production of Graphene via Plasma Chemical Vapour Deposition through varied growth time	<p>The fabrication of graphene through conventional chemical vapour deposition requires significantly high temperatures. This proves to be problematic as it could potentially cause harm the various materials involved. The fabrication of graphene at lower temperatures through plasma enhanced chemical vapour deposition (PECVD) was conceived and is still being researched. Graphene fabrication through PECVD could potentially be scaled at an industrial level. Plasma enhanced chemical vapor deposition synthesizes a mixture hydrogen and methane/ethane gas mixture on a metal substrate i.e. copper or nickel to form graphene. The advantages of PECVD over the conventional chemical vapor deposition are that it has shorter production rate i.e. it is a single step process, and utilizes a lower temperature, minimizing the potential harm it could cause the materials involved. Various factors such as temperature, pressure, growth time, and etc. can affect the properties of the graphene product. This research is intended to determine how various growth time affects the properties of the finished graphene product.</p>	MSc
7	Maziyar Sabet	The effect of gas mixture of methane and hydrogen in graphene production via Plasma Enhanced Chemical Vapour Deposition (PECVD)	<p>This research project will concentrate on the development of graphene production via PECVD which is the modernize version of CVD in vacuum in order to order to find the optimal data or factors which is, in this case, the gas mixture of methane and hydrogen ratio. The goal is to get the optimum gas mixture which produces a graphene sheet of higher quality and use them as a guideline to industrialize the graphene production. Also, this research project also focuses on the development of the graphene production via PECVD with a lower thermal energy.</p>	MSc
8	Maziyar Sabet	The effect of Plasma Power Change in Graphene production via Plasma Enhanced Chemical Vapour Deposition	<p>Graphene is one of the 2-Dimensional materials in the family of carbon allotropes. The excellent characteristics of graphene such as the electrical, mechanical and optical properties have given an enormous attention as the next generation material. Graphene can be considered as one of the most possible for highly performance and flexible electronic devices. Therefore, for large production of graphene, Plasma Enhanced Chemical Vapor Deposition (PECVD) method can be used. This method can shorten the process time, single step and operate at low temperature. Furthermore, it also able to prevent defect problem of graphene growth. A Plasma Enhanced Chemical Vapour Deposition is used to synthesis graphene from hydrogen /methane gas mixture on the copper substrates. Plasma Enhanced Chemical Vapour Deposition (PECVD) has a good dielectric of deposited layer. This method use plasma power to support the growth process. The plasma power can be adjusted to optimize the</p>	MSc

			process of graphene synthesis. The characterization of graphene can be carried out using Raman Spectroscopy, Transmission Electron Microscopy and Scanning Electron Microscopy techniques.	
9	Mazyar Sabet	The Effects of Altering Inlet Percentage Gas Mixture of Ethane and Hydrogen Using Plasma-Enhanced Chemical Vapour Deposition	Recent years have witnessed a revolution in Graphene and its application. Graphene, a one-atom-thick crystal of carbon has distinctive physiochemical properties, tremendous mechanical performance and outstanding electrical and thermal conductivities. These characteristics show Graphene as an alternative to replace many traditional materials for many applications. There are different methods to fabricate and characterize Graphene, which are currently scalable and others still on the lab scale. For this research, Plasma-Enhanced Chemical Vapor Deposition (PECVD) is used to fabricate graphene, and several spectroscopy and microscopy techniques are used to characterize the graphene which consists of Raman Spectrometry (RS), Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM), Optical Transmittance (OT), and Electron Mobility (EM). PECVD, a potentially, industrially, scalable route for graphene synthesis uses a gas mixture of hydrogen and hydrocarbon on a metal substrate with features that can alter the system's variables under lower temperature. Characterization is usually conducted after fabrication.	MSc

Centre for Innovative Engineering (CIE)

Academic Staff: <http://www.utb.edu.bn/about-cie/>

No.	Lecturer	Research Topic	Brief Description	Level
1	Somnuk Phon-Amnuaisuk	Simulating complex behaviours	Realistic animation of agents' activities in a 3D virtual environment has many useful applications, for examples, creative industries, urban planning, military simulation and disaster management. Simulation is a good approach in this kind of domain since complex behaviours can be extensively studied in the virtual environment.	MSc/PhD

2	Somnuk Phon-Amnuaisuk	Smart Interactive Wall	Mathematics Wall aims to create an interactive problem solving environment where the system intelligently interacts with users. The wall accepts handwritten mathematical problems and provides answers and well as useful explanations to the problem-solving process.	MSc/PhD
3	Somnuk Phon-Amnuaisuk	Smart Nursery	Smart nursery is a niche market that has been quickly growing in the past decades. This is attributed to the economic pressure in our modern lifestyle where both parents often opt to work to increase their income. Baby monitoring gadgets are emerged as parenting tools in the urban lifestyle. It provides a means for parents to monitor the well-being of their babies when they have to attend to other chores and cannot be present in the same physical space. The common functionalities of baby monitoring products are movement detection, breathing detection, remote visual and audio monitoring.	MSc/PhD
4	Somnuk Phon-Amnuaisuk	Emotion analysis	Human facial expressions are controlled by muscles which may be voluntarily or involuntarily controlled. Facial expressions convey emotions and are essential in human interactions. The universality of human emotional expressions can be employed to define humans' perceptions in various applications, for example, getting a customer's feedbacks for business and services, defining audience's reactions in creative industries, enhancing safety while driving or operating machines.	MSc/PhD
5	Somnuk Phon-Amnuaisuk	Plant Species identification	Plant species identification aims to provide an online identification service. In contrast to traditional manual identification of species which involves navigating keys that consists of series of prescribed identified steps. In this work, plant species are identify from it visual appearances.	MSc/PhD

Centre for Transport Research (CfTR)

Academic Staff: <http://www.utb.edu.bn/centre-for-transport-research-cftr/>

No.	Lecturer	Research Topic	Brief Description	Level
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1	Tan Soon Jiann, El-Said M.M. Zahran and Yap Yok Heo	An innovative method to determine geometric design for improving road safety	<p>The geometric design of roads is a key input into their safety performance, as it influences the operating speeds of the traffic, the lateral forces acting on the vehicles, and therefore potentially the severity and frequency of road traffic accidents. This project aims to develop a unique application of Global Navigation Satellite System (GNSS) surveying to evaluate the geometry of existing roads. Current tools available to road safety auditors are limited to those reliant on qualitative on-site observations or satellite imagery to assess the geometry of the road, if as-built or construction drawings are not available. The proposed non-intrusive method of measuring road geometry would enable more reliable quantitative evaluation, and allow better remedial measures to be identified to improve the safety of the road. Such a method will be a significant contribution to the field of road safety auditing, by expanding the toolkit available to the road safety auditor.</p>	MSc
2	Tan Soon Jiann, El-Said M.M. Zahran and Yap Yok Heo	An investigation into the high road traffic accident rate on a curve at Jalan Kumbang Pasang	<p>The section of the Jalan Kumbang Pasang dual carriageway between the Jalan Gadong and Jalan Ong Sum Ping signalised junctions is characterised by a relatively sharp horizontal curve at its midpoint, and has recorded a high incidence of road traffic accidents. Despite the introduction of various safety measures since 2013, such as pavement resurfacing with Stone Mastic Asphalt, transverse rumble strips on the curve approaches and 50 km/h speed limits, this curve has witnessed an increasing level of accidents, both in number and in severity. In 2015, 2 fatal accidents were recorded within a 3-months period claiming 4 fatalities. This research is aimed at determining the influence of driver behaviour on the high crash rate at this section of Jalan Kumbang Pasang, recommending remedial measures and monitoring their effectiveness in improving driver behaviour and thus safety at this site.</p>	MSc

3	Tan Soon Jiann, El-Said M.M. Zahran and Yap Yok Heo	Evaluation of the potential of polymer binder to stabilise pavement layers	<p>Roads form a key element for the expansion of economy and development of a country. As with most countries, Brunei has been facing a rapid development to meet the economic growth that requires an efficient road network. A significant portion of natural soil in Brunei Darussalam is fine clay and peat, which is considered a weak road foundation soil. The scarcity of conventional road aggregates in Brunei means that the country has a strong dependence on imported aggregates from overseas to construct quality roads. Restrictions on local road specifications make it almost impossible to include low quality granular materials. Meanwhile, the dependence on overseas resources is not a viable long-term solution. The aim of this research project, therefore, is to evaluate the potential of polymer binder to stabilise local pavement layers. A laboratory testing programme will be developed to characterise strength, crack and rutting resistance of polymer-stabilised local pavement layers. In order to achieve the project aim, intermediate objectives have been set:</p> <ul style="list-style-type: none"> • Review of characteristics and performance of pavement stabilised using polymers. • Evaluation and assessment of strength, crack and rutting resistance of pavement before and after polymer infusion. • Investigation of the feasibility of using polymers to stabilise local pavement layers. 	PhD
416	Tan Soon Jiann, El-Said M.M. Zahran and Yap Yok Heo	Safety impact of alternate road lights in Brunei Darussalam	<p>In Brunei Darussalam, road lights at several existing roads have been switched to alternate basis at around January 2016, and lights at recently-built roads were installed at larger spacing. This is energy-saving policy has been estimated to achieve significant savings on electricity since its implementation. However, the impact of this policy on road safety is largely unknown. This project is designed to support Majlis Keselamatan Kebangsaan Jalan Raya (MKKJR) to evaluate the safety impact of alternate road lights in Brunei Darussalam. The main aims are to investigate and determine if the light intensity on the road at night time (during alternate lighting) satisfy the lighting design criteria, and to determine if there is any correlation between road traffic accidents (RTA) and road lightings on selected road sections at</p>	MSc

			<p>night. For this purpose, the following are the two main objectives for this project:</p> <ul style="list-style-type: none"> • Development of a car-mounted light sensor system to measure existing road lighting levels • Investigation on the impact on road traffic accident rates due to alternate lighting from historical RTA data 	
5	Tan Soon Jiann, El-Said M.M. Zahran and Yap Yok Heo	Road accident data enhancement and development	To provide an evidence-based and professional approach to investigate fatal crashes and apply the results to improve road safety in the country.	MSc/PhD
6	Tan Soon Jiann, El-Said M.M. Zahran and Yap Yok Heo	GIS analysis of landslide vulnerability and risk in Brunei	To provide a landslide vulnerability map in GIS for a selected study area. The map can be used subsequently to evaluate various land stabilisation scenarios.	MSc/PhD
7	Tan Soon Jiann, El-Said M.M. Zahran and Yap Yok Heo	Road safety audit enhancement for the validation of road traffic accident hotspot analysis in GIS.	The aim of this project is an investigation into the enhancement of current road safety audit procedures, and using the enhanced procedure for the validation of road traffic hotspots based on historical accident data using various approaches of GIS hotspot analysis.	MSc/PhD

School of Applied Sciences and Mathematics

Academic Staff: <http://www.utb.edu.bn/academics/school-of-applied-sciences-and-mathematics/people/>

No.	Lecturer	Research Topic	Brief Description	Level
1	Namasivayam Navaranjan	Industry 4.0 and Its Impact on Agri-Food Manufacturing	Industry 4.0 is an industry revolution that is going to impact on all types manufacturing industries. Food processing varies widely depending on the type of product. Investing a big capital for automation and artificial intelligent may not be economically feasible for many food manufactures. This project will investigate industry 4.0 technology to implement in an appropriate production line with cost effective manner to increase production with low cost.	MSc/PhD

2	Namasivayam Navaranjan	Edible Food Packaging from Bioresources	Food packaging materials from non-renewable resources become unpopular because of their environmental pollution impact. Food industry and consumers are now interested in packaging materials which are not only biodegradable in nature, but also edible. Such successful packaging will have good potential for commercial application. This project will develop edible packaging materials from suitable bioresources.	MSc/PhD
3	Namasivayam Navaranjan	Agri-Food Supply Chain Management in South-East-Asia	Agri-Food supply chain management is often a challenge and complicated. The project is aimed to come up with a methodological solution to existing problems.	MS/PhD
4	Namasivayam Navaranjan	Integrated Farming Management to Control Snails in Rice Fields	Snails are major threat to rice crops. This project will investigate integrated pest management techniques without using pesticides.	MSc/PhD
5	Namasivayam Navaranjan	Safety and Sustainability of Bioplastics as Food Contact Materials	Bioplastics are made from various sources of biomass. Some of them are even manufactured from food sources. The project will investigate suitable bioplastics and their food safety and sustainability.	MSc/PhD

Center for Communication, Teaching and Learning

Academic Staff: <http://www.utb.edu.bn/centre-for-communication-teaching-and-learning-cctl/cctl-staff-members/>

No	Lecturer	Research Topic	Brief Description	Level
1	Malai Yunus Malai Yusof	Entrepreneurship	Research on business environment in Brunei focusing on the challenges of SME.	MSc
2	Anil Pathak	Educational Leadership	Leadership and Communication - Leadership Style	MSc/PhD
3	Lee Kok Yueh	Feedback practices in higher education institutions	This project seeks to investigate the various forms of feedback practices in higher education institutions. It will also investigate the differing perceptions towards feedback between academic staff and students.	MSc/PhD

4	Lee Kok Yueh	Self and peer assessments in higher education	This study aims to explore the effectiveness of self and peer assessments in higher education institutions. It will also be extended to find out how to implement self and peer assessments effectively in the teaching and learning process and how staff and students view self and peer assessments.	MSc/PhD
5	Lee Kok Yueh	Genre analysis of written discourse	This research will develop a framework for specific written texts. The project will identify the distinctive features or patterns of texts.	MSc/PhD
6	Lee Kok Yueh	Corpus analysis of written texts	This project will look at a collection of texts and identified the language used in the texts.	MSc/PhD
7	Lee Kok Yueh	Teaching methodologies in higher education	This research will investigate the different teaching approaches used in higher education institution and the implication on students' learning.	MSc/PhD
8	Josephine Mirador	Genre and Discourse Analysis	The study of how written texts are shaped by social practices in specific discourse communities (e.g. professional contexts)	MSc/PhD
9	Josephine Mirador	Scientific Writing	Writing specifically for documentation and exploration of topics within the realm of investigations that follow evidence-based approaches to research; Covers studying the kind of writing involved in scholarly publications	MSc
10	Josephine Mirador	Criticality	Broadly covering the areas or aspects involved in understanding the construct of criticality as it applies to written texts	MSc
11	Josephine Mirador	Academic Writing	Covers writing which addresses the situated needs of students for higher education purposes	MSc/PhD
12	Norihan Abu Hassan	Graduate Employability Skills in Brunei Darussalam	The main purpose of the research topic is to ascertain the graduate employability skills expected by the public and private sectors and to recommend policies in higher education.	MSc/PhD
13	Norihan Abu Hassan	Embedding Generic Attributes of Twenty First Century Skills in Brunei Higher Education Curriculum	The research will focus on the measurement of generic attributes required in higher education using Structural Equation Modelling. The results will contribute to a generic attribute framework that can be used to embed in Brunei higher education curriculum.	MSc/PhD
14	Norihan Abu Hassan	A Survey of Innovation, Product Knowledge and Knowledge Workers Among Firms Own by New Entrepreneurs in Brunei	The purpose of this research is to study the status of innovation, product knowledge and knowledge workers who works in firms own by young and new entrepreneurs in Brunei. The objective is to determine policy measures to help them to prosper thus addressing unemployment in Brunei.	MSc/PhD

15	Norihan Abu Hassan	Industry Expectations, Feasibility of Jobs Requirement and Opportunity Among Engineering and Technology Graduates	The research purpose is to study the expectations of the industry and the feasibility of job expectations and opportunity that is required to hire engineering and technology graduates.	MSc/PhD
16	Hjh Shanafizahwatty Hj Mat Salleh	Socio-academic adjustment international students to in UTB	Look into cultural and academic differences and adjustments made by international students studying in UTB.	MSc
18	Thulasimani Munohsamy	The use of social media in education	The purpose of this study is to investigate the impact of social media on the teaching and learning in higher education. This study also seeks to find how social media can be integrated and used for academic purposes that can benefit the students learning	MSc
19	Thulasimani Munohsamy	Professional Development training towards teaching performance	The purpose of this research is to explore the influence of professional development training towards the teaching performance of lecturers in higher education	MSc
20	Malai Zeiti Sheikh Abdu Hamid	Bilingual Education	Research on Brunei's bilingual education for the past decade	PhD
21	Malai Zeiti Sheikh Abdu Hamid	Second Language Education Motivation	Researching factors affecting motivation and the acquisition of English a second language in Brunei	PhD
22	Malai Zeiti Sheikh Abdu Hamid	Literacy and Language Education	Impact of research on reading comprehension and its effect on academic writing at higher education - Literacy practices of Brunei students	MSc/PhD
23	Malai Zeiti Sheikh Abdu Hamid	Intercultural Communication	Communication theories and culture clash/culture with various cultures (when the East meets the West)	MSc/PhD
24	Malai Zeiti Sheikh Abdu Hamid	Study on Progress in International Reading Literacy Study (PIRLS), IEA	A preliminary study of PIRLS among primary school children in Brunei in the four district	MSc/PhD
25	Malai Zeiti Sheikh Abdu Hamid	Cultural Literacy	A study of habitus and literacy practices of Brunei students from the Bourdieun perspective and its relation to socio economic status	MSc/PhD
26	Malai Zeiti Sheikh Abdu Hamid	Case study of Mastitis as a health concern among Brunei women	Causes and factors on the impact of mastitis among new mothers in Brunei	MSc/PhD
27	Malai Zeiti Sheikh Abdu Hamid	Women empowerment	Finding the voices of women in need and tackling social issues through women empowerment	MSc/PhD

School of Computing and Informatics

Academic Staff: <http://www.utb.edu.bn/academics/school-of-computing-and-informatics/sci-people/>

No	Lecturer	Research Topic	Brief Description	Level
1	Somnuk Phon-Amnuaisuk	Visual Scene Analysis for Blind People	This project proposes to analyse and describe a visual scene into a textual format, then convert these texts into sound for a blind handicap. This provides useful scene information for them.	MSc/PhD (variations of this would be audio scene analysis)
2	Somnuk Phon-Amnuaisuk	Emulating traffic scene from natural language scripts	This project proposes to construct a traffic scene in a 3D virtual environment. The components in the scene should possess believable physics for various simulation study.	MSc/PhD
3	Asem Kasem	Explainable AI for Medical Informatics Applications	AI techniques have been employed in many areas of medical data mining and medical informatics, using predictive modelling, unsupervised learning, simulation, etc. The focus of this research is on explainable techniques that can be understood by doctors and practitioners rather than just being utilized as black boxes. This includes improving existing white-box methods, such as decision trees, explaining output of black-box methods, and inventing new methods or use-scenarios.	MSc/PhD
4	Asem Kasem	Smart Education	This research focuses on the study and development of innovative techniques that can enhance education and the teaching learning experience in various settings. This includes classical educational data mining and learning analytics projects, mood detection and analysis of students, attendance taking by face-recognition, etc. The work includes applying AI techniques to existing data, collecting new data and applying/developing AI methods for it, or fusing different methods and datasets for improved educational experience.	MSc/PhD

5	S. H. Shah Newaz	Edge Computing (Fog computing)	<p>Taking account, the rising popularity of latency stringent and bandwidth hungry applications (e.g. augmented reality, virtual reality), the concept of edge computing has been introduced. Unlike cloud computing, edge computing is a small scale computing and storage facility deployed around the network access segment in order to serve the end users. Edge computing is also being part of 5G network (IMT 2020) as it would contribute in meeting performance requirements of 5G. An edge computing device could be located in a base station or embedded within an edge-network equipment (e.g. switches, edge routers). Aside from the dedicated edge computing facilities, researchers are envisioning to use the computing resources scattered around the network access segment (e.g. personal computers, computing unit of smart vehicles, robots), which will be dormant almost all the time, in order to reduce cost and benefit more users. To harness the power of such scattered and diverse computing facilities, we need to overcome several research challenges. The research scopes of this project are: (a) security and trust management in edge computing, (b) resource discovery and task scheduling and (c) energy saving in edge computing.</p>	MSc/PhD
6	S. H. Shah Newaz	Software Defined Network (SDN)	<p>Unlike the conventional network, in Software Defined Network (SDN), control and data planes are decoupled. Data plane is implemented in forwarding devices which are responsible for forwarding traffic from a source to a destination based on the instructions of the control plane located in a controller. SDN opens up the opportunity to make a network programmable. It makes a network cost-effective, reliable, flexible and easy manageable. In this research domain, we aim at proposing SDN based optical and wireless networks in order to attain the aforementioned benefits that SDN offers.</p>	MSc/PhD

7	S. H. Shah Newaz	Passive Optical networks (PONs)	Optical communication network uses optical fiber as the primary communication medium for carrying network traffic in form of light between two network nodes. Optical fiber network has leveraged the data transmission capability of today's communication networks stupendously. In our research, we study the optical network which is deployed in network access segment, namely Passive Optical Networks (PONs). Throughout the World many network operators embraced PON technology as it offers several important advantages, including low bit error rate, high speed, more secured, highly reliable, no power supply required in the middle of the network, and more energy efficient compared to other commonly used access network technologies. This research aims at increasing energy efficiency of PONs while not affecting performance of the network. In particular, this project studies sleep mode mechanism for PON equipment in order to save energy. Additionally, under this project, performance PON is evaluated using simulator or mathematical modelling.	MSc/PhD
8	S. H. Shah Newaz	Optical and Wireless Integrated networks	An optical and wireless converged network gets full advantage of the merits that optical and wireless technologies offer. The major benefits of such integration are: high bandwidth and ubiquitous access. Taking account future latency stringent application requirements, the project will develop an energy efficient optical and wireless converged network architecture. To increase energy saving while meeting latency requirements of applications, in such an integrated network architecture, the scopes of the project are: (a) network traffic forwarding path management, (b) sleep mode selection for network equipment and (c) traffic scheduling. This project uses mathematical modelling and machine learning to come up with a novel solution.	MSc/PhD
9	S. H. Shah Newaz	5G network slicing and resource management	This research focuses on network resource virtualization and mobility management in 5G network. We aim at developing a novel mechanism for network slicing in 5G where based on the individual requirements, physical resources of a network are shared among coexisting and isolated virtual networks.	MSc/PhD
10	S. H. Shah Newaz	Protocol translation in Distributed Energy Resources (DERs)	Distributed Energy Resources (DERs) uses different proprietary incompatible interfaces for communication, including Modbus, DNP3, and RS-485. Communication latency requirement between two entities in a DER could be few milliseconds so as to ensure uninterrupted power supply. In order to facilitate smooth communication among DERs with proprietary incompatible interfaces, this research aims at developing a protocol conversion mechanism with two prime objectives: (i) successful data mapping and (ii) reduce communication overhead and latency.	MSc/PhD

11	S. H. Shah Newaz	Energy demand forecast and appliances' load scheduling using Big data analytics in Smart grid	Based on different time series data collected from heterogeneous data sources (both real-time and historical data), this research aims at forecasting energy demand of households. Appliances' load scheduling is an important concept for minimizing peak load. In this research, we aim at developing a load scheduling solution in order to reduce peak load (and thereby reducing chance of a blackout) while meeting occupants comfort requirements. The solution should take into account multiple factors, including size of energy storage systems, occupancy information and type of appliance load.	MSc/PhD
12	Saiful Omar	Development of Low-Cost 3D-Printed Robotic Prosthetic Hand and Task-based Control Optimisation	Current prosthetic hands have limited functionality. Efforts in overcoming the issues have been made in both academia and healthcare industry. A great deal of information on the state of the art 3D-printed prostheses was found on public websites are not peer-reviewed. The electric-powered prosthetic hand has intuitive operability with using a myoelectric control system. However, it is expensive and heavy. Therefore, this project aims to develop a lightweight, low-cost 3D printed bionic hand and optimizing its control to obtain acceptable usability in performing specific tasks by amputee patients.	MSc/PhD
13	Saiful Omar	Digital Innovation and Transformation	Today's world we have new issues such as climate change, obesity and population ageing that has led to the need for a different approach to the design and delivery of public services. Increasingly, citizens, today expect more transparent, accessible, and responsive services from the public sector. This project aims to examine the role of Business Process Management and Industrial Revolution 4.0 to overcome the challenges and to produce innovative solutions for digital transformation in the public sector.	MSc/PhD
14	Sharul Tajuddin	Application of blockchain for verification of government processes.	The application of blockchain has majorly been associated with bitcoin. As a matter of fact, bitcoin is one solution that utilized the Blockchain Technology. In fact, Blockchain technology can be applied to various other area such as smart contracts, licensing, IoTs, and smart properties. The project proposes the application of Blockchain Technology in government processes as a verification procedure. This project will study applicability of Blockchain technology, its limitation and challenges especially in area of privacy, technical constraints as well as scalability and its economics side effects.	MSc/PhD

15	Sharul Tajuddin	Public Sector Risk Assessment and Evaluation framework	No one method or approach has optimum effectiveness in the identification of risks in different public organisations. Due to this risk assessments exercise are not popular and in many organisations of nonexistence. As a result, this increase the vulnerability of the organization and decrease its ability to be resilient. This project investigates undocumented current practices in risk assessment and by equating these practices with standard practices it is postulated that a better framework can be delivered.	MSc/PhD
16	Ibrahim Venkat	Develop robust object recognition algorithms via soft computing techniques	There are many open problems pertaining to object recognition such as recognizing objects which are subject to distortion, occlusion and so on. The aim of this research project is to propose/enhance efficient object recognition algorithms with the aid of the state-of-the art soft computing techniques. The project will provide opportunities to develop robust research prototypes which have many potential applications such as biometric security, quality control, surveillance, robotics and so on.	MSc/PhD
17	P. Ravi Kumar	Security Protection at the Network Layer of IoT using SDN	Security and privacy issues are one of the biggest challenges in IoT. IoT consists of heterogeneous devices and these devices need to be communicated with other devices and also, they need to be connected to the network. There are hundreds of new devices coming into the market every day due to the demand of IoT in different areas. Conventional security mechanisms are difficult to establish in the IoT environment. This research project will provide solutions using Software Defined Network (SDN) based protection for security issues and the heterogeneity problem in IoT.	MSc/PhD
18	P. Ravi Kumar	Application of Machine Learning algorithms in the detection of misbehaving nodes in WSN	Wireless sensor Networks (WSN) consists of diversified autonomous, tiny, low cost and low power sensor nodes. These nodes are deployed in remote locations in M2M environment and they collect data about environment etc. and send the data to the base station for further processing. Adversaries can make use of the technology and compromise a node to attack the whole network. Machine learning algorithms can be applied to detect the misbehaving nodes and a major attack can be avoided. There are some limitations in the WSN like energy, processor and memory constrained. This research contributes to understanding the WSN, Machine learning and exploring the ML algorithms to find out the misbehaving nodes in WSN.	MSc/PhD