



THE PAPUA NEW GUINEA
UNIVERSITY OF TECHNOLOGY

RESEARCH REPORT

2019

Compiled and Edited
by

Professor Shamsul Akanda

Department of Agriculture



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FOREWORD

On behalf of the Research Committee of Unitech, I am delighted to present the 2019 Research Report of Papua New Guinea University of Technology. This is a compilation of the research activities of the fourteen academic departments and four research units of the university. I am very thankful to the Dean of Postgraduate School, Professor Shamsul Akanda, for compiling and editing the report.

The Academic Board of Unitech has a Research Committee that receives applications for research funding from staff and students and allocates funds to them. It also funds attendance at conferences and organizes a weekly research seminar. In 2019, a total of K136,108.50 was given for research projects and K14,866.40 for conference attendance.

Research activities at Unitech and at most universities are spurred on by the presence of robust postgraduate programs. Supervision of postgraduate students and doing research go hand in hand. Unitech has the largest postgraduate program in the Papua New Guinea, with more than 200 postgraduate students in 2019. The majority of the students are from Papua New Guinea, but we attract postgraduate students from other Pacific Islands. This year, we also have two postgraduate students from Africa, Nigeria, who are on Association of Commonwealth Universities scholarships. The presence of research students creates an atmosphere that is conducive to research.

In the past, the Papua New Guinean postgraduate students at Unitech were either sponsored by the university, by a company or they paid by themselves. Whereas the government had scholarship programs for undergraduate study (HECAS – Higher Education Cost Assistance Scheme - and AES – Academic Excellence Scholarship) no similar schemes were in place for postgraduate study. We are pleased to see that now there is a Higher Education Loan Program (HELP) that is accessible to both undergraduate and postgraduate students. This is a big step in the right direction.

There is a well-attended weekly research seminar at Unitech. For a few years in the past this was organised by the Dean of Postgraduate School, Professor Shamsul Akanda. This task was later taken up by Professor Subramaniam Gopalakrishnan of the Applied Sciences Department and is currently led by Associate Professor William Modey of the Applied Sciences Department. I am very grateful to them for their commitment to the seminars.

I would like to take this opportunity to thank all heads of department, Team Leaders of research units and members of the Research Committee for their fruitful work during the year 2019. I also wish to thank the Vice Chancellor, Dr Ora Renagi, and his management team for their continued support and commitment of funds. Above all, I thank the Dean of Postgraduate School, Professor Akanda, for compiling the 2019 Unitech Research Report.



Dr Augustine Moshi
Pro Vice Chancellor Academic and
Chairman of the Research Committee

THE RESEARCH COMMITTEE OF THE ACADEMIC BOARD

1. TERMS OF REFERENCE

In order that research activities within the University may be encouraged, coordinated, funded and monitored efficiently, the Academic Board set up a Research Committee under the following terms of references:

- (a) To promote and encourage research and development;
- (b) To formulate an overall research policy and appropriate guidelines;
- (c) To allocate funds for research and development within the University;
- (d) To prepare an annual report on the research conducted by the University.

2. CONSTITUTION

Ex-Officio Members

- a. Vice Chancellor
- b. Pro Vice Chancellor (Academic)
- c. Chairman, ATCDI

Appointed Members

- d. One person appointed by the Vice Chancellor who shall be the Chairman of the Committee
- e. Six persons appointed biennially by the Academic Board

MEMBERSHIP

Ex-Officio Members

Associate Professor Ora Renagi, OL
Associate Professor Augustine Moshi
Associate Professor Ora Renagi, OL

Appointed Members

Associate Professor Augustine Moshi (Chairman)
Professor S. Akanda
Professor C. Gonduan
Professor T. Okpul
Dr. G. Arpa
Dr. M. Peki
Dr. W. Modey

In Attendance

Mr G. Paul, Executive Officer

Executive Summary

The Annual Research Report is a comprehensive compilation of ongoing and completed research from all the 14 academic departments at PNGUoT each year. The university completed the 2019 Academic year on a high note despite financial challenges. The *Annual Research Report 2019* contains the research priorities aligned with “Unitech 2030” and PNGUoT Strategic Plan; and national priority areas, ongoing and completed research, publications, national and overseas conference attendance by the academic staff from the 14 academic departments. During 2019, a total of 70 peer-reviewed research articles were published in reputed international and national journals along with many conference publications and book chapters. This number is about 21% higher than that of the last year. This result shows the strong commitment and resilience of our faculty members in research and publication activity, despite funding limitations, heavy teaching loads, and other challenges. The in-depth and thorough research conducted by the PG students, in turn, generates a large volume of peer-reviewed publications in the national and international journals.

Research conducted by the final year undergraduate students also constitute a large proportion of research reported by the academic departments. Many of the research outputs are very important and of immense value for tackling the problems Papua New Guinea faces. Many of these initial studies can well be elaborated on in future research.

Despite severe financial challenges, the University allocated a total of K136,108.50 to support the staff and postgraduate students’ research, and an amount of K14,866.40 for conference attendance by the academic staff and PG students. The total allocation for 2019 was about K33,108 more than that of the previous year. This fact demonstrates the PNGUoT’s strong commitment to Post Graduate studies and research to develop the scholarship and research culture required to fulfill the goal to become the technological knowledge hub for the country and the South Pacific. The funding for 2020 is substantially increased to **K364,630** which is in line with the PNGUoT Strategic Plan that emphasizes academic excellence, conducts innovative research in national priority areas of high potential and relevance, and outreach activities. This is aimed at establishing PNGUoT as the technological knowledge hub for the country as well as the Pacific Island Countries. Postgraduate studies are the global conduits for universities to develop research programs to be creative and solve complex problems through innovations leading to sustainable national developments.

The report also contains 16 abstracts presented in the “Unitech Research Committee Seminar Series” – a hallmark of Unitech. This weekly seminar series that has been running for the last seven years brings the academics, staff, and students together in a common platform to share and disseminate research findings to the wider university community. This seminar series is thereby the best forum not only to disseminate research outcomes to the wider community but also to train young academics and postgraduate students in their presentation and communication skills.

**Number of Peer-Reviewed Journal Publications for Different Academic Departments
(2013-2019)**

Departments	2013	2014	2015	2016	2017	2018	2019	Total
Agriculture	14	06	08	08	12	13	08	69
Applied Physics	0	0	0	06	21	03	05	35
Applied Sciences	04	07	09	02	0	04	02	28
Architecture and Building	01	0	0	0	0	0	0	01
Business Studies	01	1	05	07	12	04	03	33
Civil Engineering	01	0	01	03	0	0	0	05
Communication and Development Studies	03	10	05	02	06	04	04	34
Electrical and Communication Engineering	0	03	01	06	05	0	13	28
Forestry	02	02	03	0	0	03	04	14
Mathematics and Computer Science	04	02	01	0	02	01	01	11
Mechanical Engineering	01	03	01	01	01	08	16	31
Mining Engineering	03	01	01	0	0	0	0	05
Surveying and Land Studies	03	11	12	20	09	18	14	87
Total	37	46	47	55	68	58	70	381

Departmental Research Reports

Agriculture

Applied Physics

Applied Sciences

Architecture and Building

Business Studies

Civil Engineering

Communication and Development Studies

Electrical and Communication Engineering

Forestry

Mathematics and Computer Science

Mechanical Engineering

Mining Engineering

Surveying and Land Studies

DEPARTMENT OF AGRICULTURE

Head of Department: Dr Rajashekhar Rao BK

The Department of Agriculture is one of the 13 Academic Departments in Papua New Guinea University of Technology. Department offers undergraduate and postgraduate degree programs in Agriculture, conducts agricultural research and disseminates new insights to the community. At undergraduate level, a four year study program- the Bachelor of Science in Agriculture [B.Sc.(Ag)] and a hybrid model Open, and Distance mode taught Bachelor of Agriculture and Rural Development (B. Ag. & R.D) are on offer. Three postgraduate degree programs- Master of Science in Agriculture (MScAg), Master of Philosophy (MPhil), and Doctor of Philosophy (PhD) are also offered by the Department. The MSc in Agriculture program is a combination of course work and research, while PhD and MPhil studies are fully research-based degrees.

The Department has 16 qualified academic staff members (12 with PhDs and 1 on study leave pursuing PhD studies overseas). In 2019, three students graduated with postgraduate degrees (1 MPhil and 2 MSc). The Department of Agriculture is committed in delivering quality teaching, research, outreach activities and post-graduate studies. Department's activities are well guided by the Department's Five-Year Strategic Development Plans (2005 – 2010 and 2011 – 2015). Now with the Unitech's Strategic Plan 2020-24, an implementation plan has been prepared to carry forward research activities. The curriculum is enhanced through regular and periodic review in consultation with stakeholders and industries in the public and private sectors. The Department has established strong collaborative research links with international developmental partners and stakeholders, including Australian Centre for International Agricultural Research (ACIAR) and New Zealand AID. Regular publication of the scientific journal '*Niugini Agrisaiens*' and academic staff publishing scientific papers regularly confirm the department's strong commitment in research at Unitech. Strong collaborative research collaborations exist with PNG National Agricultural Research Institute (NARI), University of South Pacific (USP), Fiji, Charles Sturt University (CSU), Australia, National Research Institute (NRI) of Greenwich University (U.K.), South Australian Research and Development Institute (SARDI), Australia, University of Canberra,

Australia, Curtin University, Australia and other NGOs, industries and institutions further cements our strong leadership in agricultural research. Other publications, compilation of abstracts of research done by the post- graduate students, Annual Reports, Farm Report and Strategic Plan on annual basis also strengthens the department's research capacity. In 2016, Unitech Biotechnology Centre was amalgamated to the Department of Agriculture for the administrative oversight.

PNG University of Technology is an Associate Member of Asia- Pacific Association of Agricultural Research Institutions (APAARI) through the Department of Agriculture. The APAARI is located in Bangkok, Thailand aimed at strengthening research and innovations for sustainable agricultural development in Asia and Pacific.

The following research focus areas have been identified and much of the staff and student research are woven around these thematic areas:

AREAS OF RESEARCH

Research Focus Area – 1: Crop Sciences

- Evaluation of promising rice varieties for Papua New Guinea
- Crop improvement and adaptation to stress environments caused by climate change
- Use of *Trichoderma* spp. as a biocontrol agent against some selected soil borne pathogens
- Study of the production technology and practices of selected crops by farmers in different agro-ecological regions of Papua New Guinea
- Study of the production technology and practices of selected vegetables by farmers in different agro-ecological regions of Papua New Guinea
- Soil N and composting in sweet potato-based farming systems
- Symbionts as potential biocontrol agent for cocoa pod borer
- Development of a maize seed system for PNG
- Gene discovery in PNG wild rice: seed and grain characteristics
- Genetic transformations of taro and rice
- Quantification of greenhouse gases (GHG) emissions from soils under major cropping systems of Papua New Guinea

- Development of fungal inoculum for artificial agarwood production in PNG

Research Focus Area – 2: Livestock Sciences

- Conservation of farm animal genetic resources
- Utilization of crop wastes and agro-industrial by-products for feeding livestock and poultry
- Determining digestibility of locally available feed and fodder
- Determination of anti-nutritional factors in the fodder crops of PNG
- Development of suitable weaner piglets diet
- Smallholder Aquaculture development in PNG

Research Focus Area – 3: Agricultural Economics

- Analysis of marketing costs and margins spread of sweet potato sales produced from the highlands of Papua New Guinea
- Economic impact assessment of honey bee
- Coffee integrated farming in Eastern Highlands Province
- Economic impact of climate change on coffee and cocoa production in PNG: A Ricardian Approach
- Handbook on relevant production, trade and price statistics on agricultural, livestock and poultry products of PNG
- Agriculture sectorial growth in Papua New Guinea since political independence

Research Focus Area – 4: Agricultural Extension and Rural Development

- Evaluation of on-going extension approaches in PNG and their effectiveness in rural livelihood improvement
- Problems and prospects of retaining youth in agriculture in PNG
- Identifying the present farming systems in different regions of PNG and scope for improvement
- Examining household food security in peri-urban settlements
- Livelihoods of settlers in peri-urban settlements
- Return from Investment in Higher Education, Extension and Innovations

- Entrepreneurship Development among Rural People
- Women in Agriculture for Food Security
- Diffusion of Agricultural Innovations among Rural Community

Research Focus Area – 5: Post-Harvest Technology

- Survey on current status of mechanization in PNG: impact study of mechanization on rural livelihood and environment
- Development of post-harvest technology and post-harvest management systems for horticultural crops in PNG

RESEARCH INTERESTS OF ACADEMIC STAFF MEMBERS

No	Academic staff	Areas of research interest
1	Dr Rajashekhar Rao B.K.	Soil Science, Soil quality, Soil fertility, Soil pollution, Agricultural Chemistry
2	Mr Nick Kewa	Agricultural economics, climate finance, supply chain management
3	Professor Shamsul Akanda	Plant pathology, Integrated disease management, Research methods
4	Professor Gariba Danbaro	Animal breeding, Animal management systems, Research methods
5	Professor Tom Okpul	Plant breeding and genetics, Tissue culture, Biotechnology
6	Dr Jayaprakash	Veterinary Science, Animal nutrition, Animal health and diseases
7	Dr Peter Manus	Agricultural economics, Agribusiness management
8	Dr Macquin Maino	Plant pathology, Nematology, Biocontrol agents, Plant physiology
9	Dr Veronica Bue	Agricultural extension, women in agriculture, rural sociology

10	Dr Patrick Michael	Natural resource management, field crops, agriculture and environment
11	Dr Ronnie Datoana	Agricultural entomology, Integrated pest management, Biocontrol agents
12	Dr William Kerua	Agricultural extension, Rural extension systems
13	Dr Gwendolyn Ban	Plant pathology, Biocontrol agents
14	Mr William Nano	Agricultural extension, Animal nutrition, Aquaculture, On-farm trainings
15	Mrs Betty Tiko Motoro	Agricultural extension, rural sociology
16	Mr Frank Vidinamo (Study leave)	Agricultural Engineering, Post- harvest technology

EXTERNALLY FUNDED RESEARCH PROJECTS/ COLLABORATIONS

Ronnie Dotaona (2019). PNG Oil Palm Research Association on Coconut flat moth research

Ronnie Dotaona (2019). Ramu Agri Industries Ltd on Sugarcane top shoot borer research

Ronnie Dotaona (2019). Sweet potato crop protection and improvement (NARI, FPDA, Charles Sturt University - Australia, University of Southern Queensland - Australia)

LIST OF JOURNAL ARTICLES PUBLISHED

Kerua, W. (2019). Livelihood diversification and its impact on cocoa production in Morobe and East New Britain Provinces of Papua New Guinea, *International Journal of Agricultural Extension*, 7(1),117-124.

Maraia, H., Orsak, L., Gideon, O. & Okpul, T. (2019). An update on the distribution and morphology of *Ixora amplexifolia* (Ixoroideae, Rubiaceae) in Papua New Guinea. *Phytotaxa*, 409(3), 172-178.

Michael, P. S. (2019). A procedure for *Agrobacterium tumefaciens* mediated genetic transformation of sweet potato. *Asian Journal of Advances in Agricultural Research*, 11(4), 1-8.

- Michael, P. S. (2019). Current evidence and future projections: a comparative analysis of the impacts of climate change on critical climate-sensitive areas of Papua New Guinea. *Journal of Soil Science and Agroclimatology*, 16(2), 229-253.
- Michael, P. S. (2019). Responses of different explants of sweet potato on modified MS and LS based nutrient media in vitro. *Asian Journal of Advances in Agricultural Research*, 11(4), 1-7.
- Michael, P. S. (2019). Roles of *Leucaena leucocephala* (Lam.) on sandy loam soil pH, organic matter, bulk density, water-holding capacity and carbon stock under humid lowland tropical climatic conditions. *Bulgarian Journal of Soil Science*, 4(1), 33-45.
- Michael, P. S. (2019). Phytoremediation of heavy metals by water hyacinth in sewage wastewater stabilization ponds under humid lowland tropical climatic conditions. *International Journal of Environment*, 8(1), 30-42.
- Saki, T., Yomi, M., & Rajashekhar Rao B.K. (2019). Critical nitrogen content and nitrogen nutrition index for optimum nitrogen nutrition in sweetpotato. *Journal of Plant Nutrition*, 42(15), 1750-1759. DOI:10.1080/01904167.2019.1648685
- Vitinaqailevu, R., & Rajashekhar Rao B.K. (2019). The role of chemical amendments on modulating ammonia loss and quality parameters of co-composts from waste cocoa pods. *International Journal of Recycling of Organic Waste in Agriculture*, 8, 153-160. DOI: 10.1007/s40093-019-0285-3

BOOK CHAPTERS

- Pamphilon, B., Bue, V., & Wantum, F. (2019). Research and Learning from the 'Inside Out': Processes, Practices and Pedagogy of a Women's Agricultural Economic Empowerment Project in Papua New Guinea. In: Lila Singh Peterson and Michelle Carnegie, *Integrating Gender in Agricultural Development: Learnings from South Pacific Contexts*. Emerald Publishing, ISBN No: 978-1-78973-056-2
- Peterson, L.S., Carnegie, M.R., Bourke, M., Bue, V., Kunatuba, J.L., Laqeretabua, A., Moala, T., Pamphilon, B. & Vilisoni, M.T.J. (2019). Reflections from the South Pacific – Navigating

Intersectionality and Customary Contexts to Progress Gender Equality and Gender Equity.
In: Lila Singh Peterson and Michelle Carnegie, *Integrating Gender in Agricultural Development: Learnings from South Pacific Contexts*. Emerald Publishing, ISBN No: 978-1-78973-056-2

RESEARCH COLLABORATIONS

- Bue, V. (2019). COLLABORATED WITH Curtin University on an ACIAR Project: Identifying opportunities and constraints for rural women's engagement in small-scale agricultural enterprises in PNG. Australian Centre for International Agricultural Research (ACIAR). ASEM 2014/054. *Advisory role and supervision of MSc student linked to the Project*.
- Bue, V. (2019). COLLABORATED WITH: Greenwich University, UK on European Union funded project – Vanilla Value Chain Study in PNG – August 2018-2019

RESEARCH REPORTS

- Coote, C., Bue, V., Lamboll, R., & Farrall, H. (2019). Vanilla Value Chain Analysis in Papua New Guinea. The National Research Institute, Greenwich University, United Kingdom.
- Maino, M.K., Markward, R., & Langilangi, F. (2019). “Approval to Deliver” a Diploma Program - Vanuatu Agricultural College, Espiritu Santo. A Technical Report on Quality Assessment submitted to the Vanuatu Qualifications Authority, June, 2019, pp. 29.
- Maino, M.K., Markward, R., & Langilangi, F. (2019). “Course Accreditation” for Diploma Program - Vanuatu Agricultural College, Espiritu Santo. A Technical Report on Quality Assessment submitted to the Vanuatu Qualifications Authority, June, 2019, pp. 28.

WORKSHOP/CONFERENCE/PROFESSIONAL MEETINGS ATTENDANCE

- Liu, J., Wilson, B.A.L., Ash, G.J., Komolong, B., Geno, R.K., Wau, W., Pitiki, M., Dotaona, R., Culas, R., Agiwa, A., & Gurr G. (2020). Working with smallholder farmers in Papua New Guinea to protect sweetpotato crops using habitat manipulation, organic mulches, and entomopathogens. XXVI International Congress of Entomology, Helsinki.

- Akanda, S. (2019). National Research Leaders' Dialogue. Organized by the National Science and Technology Secretariat at Port Moresby, 25-26 June 2019.
- Betty, T. (2019). Attended Erasmus – Plus Mobility Program. University of Valladolid, Spain. (16 – 20 December, 2019)
- Bue, V. (2019). Attended Erasmus_ Plus Mobility Program. University of Valladolid, Spain. (9th-18th June 2019)
- Bue, V. (2019). Attended PNG Impact Conference, UPNG, December 3-4, 2019.
- Bue, V. (2019). Attended Pacific Women Shaping Pacific Development. PNG gender Equality Transformative Approaches Review Workshop, 9-11 December, 2019, Port Moresby
- Rajashekhar Rao B.K. (2019). Invited participant in the annual review meeting of TADEP, Australian Centre for International Agricultural Research, Monday 18 June- Thursday 20 June, 2019 at Goroka, Papua New Guinea
- Rajashekhar Rao, B.K. (2019). Participated and delivered an invited lecture entitled Assessment of the heavy metals pollution from mining activities in a national workshop on Environmental Impact Assessment (EIA) of mining industries at the Department of Civil Engineering, Unitech, Nov, 04-05 at Lae, PNG
- Rajashekhar Rao, B.K. (2019). Participated in the review of Strategy and Result Framework of National Agricultural Research Institute (NARI) on October 31, 2019 at Lae, PNG

POSTGRADUATE STUDENTS' RESEARCH

Student	Research topic	Funding source	Supervisor
PhD Program			
Spencer POLOMA	Effects of mycorrhizal symbiosis on alleviating drought stress, NPK uptake, physiological parameters and yield of rice (<i>Oryza sativa</i> L.)	Self	Dr M. Maino
David TIMI	Characterization and biological assessment of phytosynthesized	Self	Dr. M. Maino (Co-supervisor)

	silver nanoparticles. Graduated April, 2019.		
MSc.Ag. Program			
Raymond MANUS	Investigating occurrence of retrotransposons in taro, <i>Colocasia esculenta</i> (L.) Schott	GAP	Professor T Okpul
Loretha SELMATIN	Investigating DNA Markers associated with cross-incompatibility in Sweetpotato	GAP	Professor T. Okpul
Camari DIVUNIWAQI	Effects of biochar on nickel polluted soils	BULA	Dr R. Rao
Amelia JELSIWI	Physiological responses of rice varieties to saline regimes	Trukai Industries Ltd	Dr M. Maino
Dolores KAMANG	Allocative efficiency, profitability and attitude of smallholder rice farmers in Madang, Papua New Guinea	Trukai Industries Ltd	Dr P. Manus
Gerega MAIGA	Diversity of rhizosphere-associated entamopathogenic fungi in parts of Papua New Guinea and their effects on sweetpotato weevil pest	Self	Dr. R. Dotaona
Lisa PASKALIS	Investigating the inheritance pattern for gene(s) conferring resistance to the storage weevil, <i>Sitophilus zeamais</i> Motschulsky from a locally inbred maize population in Papua New Guinea	GAP	Prof. T. Okpul
Raylin GENA	Examining the success and constraints of women fresh produce	ACIAR	Dr V. Bue

	resellers at Lae Urban Market in Morobe Province, Papua New Guinea		
Stella PURI	Assessing the risk of soil and food contamination from upstream mining activities in the Lower Watut Area	Trukai Industries Ltd.	Dr R. Rao
Ava KANI	Marketing channel and margin analysis of fresh fish: A case study of fresh fish marketing at Koki Market, Port Moresby, PNG	Self	Mr N. Kewa
M Phil. Program			
Sharon Agovaua	Investigating the biology and control options of the Coconut Flat Moth (CFM), <i>Agonoxena</i> sp. new (Lepidoptera: Agonoxenidae)	PNG OPRA	Dr R. Dotaona
Lawrencia Kikitam	Developing management strategies for the top-shoot borer, <i>Scirpophaga exceptalis</i> Walker (Lep.: Pyralidae) at Ramu, Papua New Guinea	RAIL	Dr R. Dotaona (Co-supervisor)
Stanley YANE	Characterizing soil water holding capacity of oil palm growing soils in PNG	PNG OPRA	Dr R. Rao (Co-supervisor)

FINAL YEAR UNDERGRADUATE STUDENTS' RESEARCH PROJECTS

#	Name	Supervisor	Title of the research project
1	Aisanaga Robert	Dr Kerua	Training needs assessment of farmers in Situm Village, Nawaeb District

2	Kioto Neville	Dr Kerua	Value chain analysis of the egg production & marketing in Unitech Campus
3	Powa Ben	Mr Kewa	Market chain analysis of bulb onion produced in Gembogl District, Simbu Province
4	Faith S'aa	Mr Kewa	A market chain analysis for local and NARI taro varieties in Lae District, PNG
5	Eunoch Jack	Dr Bue	Generating livelihoods: a case study of unemployed households in Kamkumung peri-urban settlement in Lae, Morobe Province
6	Esther Moses	Dr Bue	A comparative analysis on the perceptions of Unitech students regarding food served in the mess by the new and previous catering company
7	John Komek	Mrs Mоторo	Factors influencing the farmers' decision on the marketing strategies of coffee production in Morobe Province
8	Sylvia Sako	Mrs Mоторo	Strategies used to withstand financial vulnerability by small scale farmers of Buana village in Morobe Province
9	Sogo Yuanis	Mr Nano	Effect of coffee cherry refuse on the growth performance of talapia fingerlings
10	Nelson Kenny	Prof Danbaro	Performance of broiler chickens on diets formulated from leucaena leaf meal, bloodmeal and cassava root meal
11	Sean Mageto	Dr Dotaona	Effects of entomopathogenic fungi (EPE) on the fecundity and feeding behaviour of <i>Euscepes postfasciatus</i> at sub-lethal dose
12	Chrissabella Komboni	Dr Dotaona	Development and life history of Maize weevil (<i>sitophilus zeamais</i>) on stored maize
13	Dylan Thomas Male	Dr Dotaona and Geoff Gurr	The interactions between entomopathogenic fungi (<i>Metarhizium</i> and <i>Beauveria</i> spp.) and

			mulching in the crop protection of sweet potato (<i>Ipomoea batatas</i>) from weevils (<i>Cylas formicarius</i> and <i>Euscepes postfaciatus</i>) in Papua New Guinea.
14	Jordan Lape	Dr Dotaona	Behaviour of <i>Oribius</i> weevils infected with <i>Metarhizium</i> species
15	Roberta Sio	Dr Dotaona	Effects of EPE on the fecundity and feeding behaviour of <i>Cylas formicarius</i> at sub-lethal doses
16	Dollah Inapo	Dr Ban	Efficacy of <i>Trichoderma</i> against <i>Cylas formicarius</i> of sweet potato
17	Juthro Wundewahin	Dr Ban	Efficacy of <i>Metarhizium</i> strains against selected fungal pathogens
18	Thomas Oso	Dr Ban	Antimicrobial activity of local <i>Trichoderma</i> isolate against pathogenic bacteria and fungi
19	Jamie Babola	Prof Akanda	Screening the rice varieties/lines against bacterial blight
20	Lista Obert	Prof Akanda	Screening of rice varieties/lines against sheath blight
21	Sharmine Midi	Dr Rao	Effect of biochar addition on soil respiration of nickel polluted soil
22	Josephine Zaffar	Dr Rao	Effect of kunai biomass addition on soil respiration of nickel polluted soil
23	Gerry Faure	Prof Okpul	Investigating cocoa cross incompatibilities
24	Shaun Narimbi	Prof Okpul	Investigating nastic movements in wild swamp rice (<i>Leersia hexandra</i>)
25	Israel Kokinson	Dr Michael	The roles of biochar, farmyard manure, and their co-applications on selected soil properties of a sandy soil and on the growth of taro plants

26	Amon Muri	Dr Michael	Composting to nutrition - effects of composted mounds on tuber yield and nutrition content of sweet potato under humid tropical lowland tropical climatic conditions
27	Elizah Pakne	Dr Michael	Soil carbon and nitrogen dynamics under different crops and their long term effects on selected soil properties under humid lowland tropical climatic conditions
28	Butler Otio	Dr Michael	Efficient vegetable cool storage for Lae city markets
29	Patrick Tikio	Dr Michael	Soil carbon and nitrogen dynamics under different pasture and grasses and their long-term effects on selected soil properties under humid lowland tropical climate conditions

AWARDS FOR RESEARCH AND SCHOLARSHIP

William Kerua (May – Nov 2019): **Institutional-John Dillon Fellowship Award** –Certificate in regional and institutional- based in leadership, governance, research management and executive management.

Ronnie Dotaona (May – Nov 2019): **Institutional-John Dillon Fellowship Award** –Certificate in regional and institutional- based in leadership, governance, research management and executive management.

Gwendolyn Ban (May – Nov 2019): **Institutional-John Dillon Fellowship Award** –Certificate in regional and institutional- based in leadership, governance, research management and executive management.

DEPARTMENT OF APPLIED PHYSICS

Head of Department: Dr. Gabriel Anduwan

The Department of Applied Physics is relatively small in terms of building, but the department serves a lot of students just like other service departments. We used to have two courses running: the Bachelor of Science in Applied Physics with Electronics and Instrumentation (BSAP) and Bachelor of Science in Radiation Therapy (BSRT). However, we have shelved BSRT program for now until the Health department need some more graduates, then we will start running the BSRT program again. While running BSAP program, we provide service courses to 10 other departments out of 13 departments in this University. This year we have started another new program; which is Bachelor of Engineering in Biomedical Engineering (BEBE). We have started with only fifteen (15) students who are school leavers.

The Applied Physics course with electronics and Instrumentation with more emphasis on the principles of application to Physics are imparted to students. The students are grounded with analytical skills and all the application to Physics principles. The graduates of Applied Physics students are working all over the country and few overseas. They are employed in any work related to Physics. Some are working in the Airline industry; education, mining industry, PNG Power and even some are doing private consultancy work.

The new Biomedical Engineering program is geared towards working in the Health Department. As soon as they graduate, the Health Department will employ them in all the general hospitals in the country. Their job is basically to ensure the equipments in the hospital are up and running for the services needed almost every day by health workers and the sick patients.

We have two Post Graduate programs are running in the department. Our Master of Science in Applied Physics and Master of Philosophy in Applied Physics have been in existence for over 11 years now. Last year we have started another Post Graduate program, Master of Technology in Exploration Geophysics. We have 20 PG students doing both programs leading towards Masters degree, 1 PhD student while 2 staff members are doing master and 2 staff members are doing doctoral studies. We hope to continue maintain the number of PG students in the near future.

A. Research Publications

1. Hoang, V.Q.T., Hoang,T-Q-P Phan, Velusamy, S., Doan, V.T. Yong Soo Kim, & Minh-Vien Le. (2019). Enhanced photocatalytic activities of vanadium and molybdenum co-doped strontium titanate under visible light. *International Journal of Applied Ceramic*

Technology, (The American ceramic society), 16, 1651-1658.
<https://doi.org/10.1111/ijac.13248>

2. Jojo, P.J., Epemu, P. V., Pereira, F. B., & Anduwan, G. (2019). Radon in dwellings of Papua New Guinea: Observations of a preliminary study. *International Journal of Environmental Science and Development*, 10 (6).
3. Mukhopadhyay, B., Mukhopadhyay, M., Elawadi, E., Ghosh, U.K., & Pramanik, K. (2019). Cinder cone morphometry in relation to gravity anomaly zones in the Harrat Al-Birk and Asir Foreland, SW Saudi Arabia. *J. Earth Syst. Sci.*, Indian Academy of Sciences, 128 (6), 158.
4. Mukhopadhyay, Manoj, Elawadi, E., Mukhopadhyay, B., Venkatesh, K.D., & Al-Arifi, N. (2019). Geophysical constraints on a modified crust below the Rayn Anticlines, Eastern Saudi Arabia. *J. Asian Earth Sci.*, 188, 104105, 1-12
5. Pereira, F. B., Renagi, O., Panakal, J.J. & Anduwan, G. (2019). A Study of Climate variability in Papua New Guinea. *J. of Geosci. and Environ. Prot.*, doi:10.4236/gep.2019.75005, pages 45-52. Publisher: Scientific Research Publishing

B. Student Projects

1. Design of an Electronic Circuit Design: Ultrasonic Mosquito Repellent, Nick Toh, Roberto Soto
2. Design of a Steady State Digital Temperature Control System, Nathan Randa, Roberto Soto
3. Composite Aluminum Honeycomb-Core Cut-Out 3D Measurement & Cutting System for Air Niugini, Mitchell Gibson, Roberto Soto
4. Ports & Customs Cargo Container X-Ray Inspection System, Kaloma Kandu, Roberto Soto
5. Design of a Basic Earth Movement Sensor, Jason Matautu, Roberto Soto
6. Aircraft Traffic System in PNG: a Proposal, Kenson Tonny and Steven Minana, Roberto Soto
7. Aircraft Traffic System in PNG: a Proposal, Simeon Ifu, Roberto Soto. Proposal for a 16 Kilowatts Micro Hydropower for Nebilyer High School in Lower Nebilyer District in Western Highlands Province, Daniel Daiu, Roberto Soto
8. Synthesis and study of the photocatalytic effect on semiconducting oxide nano-materials, Gracelyn yinil, Velusamy Senthilkumar

DEPARTMENT OF APPLIED SCIENCES

A/Head of Department: Reilly Nigo

Introduction

The Department functions with two sections: Applied Chemistry and Food Technology. Food Technology courses are only offered in PNG University of Technology in the whole of the South Pacific (except Australia and New Zealand).

Vision: “To become a quality department that produces intellectual manpower for Papua New Guinea’s development and sustenance.

” **Mission:** “To focus on high-class teaching and quality research, continuously strive to produce future leaders rich in intelligence and innovations in the field of Applied Chemistry and Food Technology and simultaneously concentrate in strengthening and enlightening the community”.

The average employment rate of its graduates is more than 60% within three (3) months after graduating with Bachelor of Science in Food Technology or Bachelor of Science in Applied Chemistry.

The Department, based on the current market scenario and other developments, keeps track on the curriculum, and suitable changes and revisions to the curriculum were done in the past. The Department also embarked into balancing the total credits, as much as possible, so that the students undergo a smooth teaching-learning process.

The Department has strong emphasis on research. Our target is to publish one paper in an international journal annually. To encourage research activities and eventual publication, the Department has taken on a new initiative to reward those who publish internationally a cash reward of K200 per publication and national journal publication with cash reward of K100 per publication.

The Department has actively engaged industries through Industrial Advisory Committee (IAC) for their input on curriculum review on the two courses it offers and also few industry-based research work through its final year and MPhil projects.

The research activities are broadly classified into:

- (a) **Chemistry:** Environment, material science, water and organic chemistry related research.
- (b) **Food Technology:** Food processing, clean energy, quality control and nutrition related research.

The research activities of the two sections are provided below.

Research interests: Applied Chemistry Section

No.	Name	Research interests
1	Prof. Subramaniyam Gopalakrishnan	Organic chemistry, medicinal chemistry, petroleum chemistry, nanotechnology and Spectroscopy
2.	Associate Professor William Modey	High Resolution chromatographic separations; Air pollution research; Ambient particulate sampler design and evaluation; Determination of trace contaminants in aquatic media (particularly heavy metals, and the global emerging issues on pharmaceutical contaminants) ; Determination of toxic organic pollutants in air and aquatic media; Supercritical fluid technology for extractions and chromatographic separations; Environmental and social impact assessment (ESIA) for regulatory assessment.
3	Dr. Srikanth Bathula	My research field of interest are include; Chemical Speciation and Bioavailability, Environmental studies, Geomorphological impact assessment on groundwater quality, Coastal Groundwaters–A Geo-hydro Chemical Exploration, photo catalytic activity and degradation, Synthesis and characterisation of nano materials.
4	Dr. Sivakumar Balakrishnan	My research interest falls on five main themes – Metal-Organic Frameworks (MOFs), Porous silicon, Carbon materials, Ceramics and Phosphors. All of these materials find applications in a variety of fields. I am mainly interested in exploring the composite materials made out of these materials. For example, one of the projects that I am investigating is the anchoring of MOFs on to porous and crystalline silicon. It is envisaged that this will create new materials with added properties from their individual starting materials.
5	Dr David Timi	Organic chemistry, phytochemistry

6	Mr. Justin Narimbi	Analytical chemistry, environmental chemistry, instrumental methods for analysis, Water quality assessment and monitoring, Laboratory quality management.
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Research interests: Food Technology Section

No.	Name	Research interests
1	Mr. Reilly Nigo	Renewable and Clean Energy, Animal Feed Development, Thermal Processing, Food Drying Studies Using Solar and Clean Energy Systems, Food Product Development Processes.
2	Dr. Lydia Yalambing	Nutrition intervention studies, compliance studies in terms of food fortification and food nutrition labels; Complementary/supplementary food development and Food Composition studies.
3	Mrs. Sogoing Denano	Food safety and food security; compliance studies.
4	Mr. Nigel Kiaka	Industrial solid and liquid waste management
5	Mrs. Rag Gubag-Sipou	Food microbiology, microbial quality of food and water, medicinal studies of indigenous plants.

Research Output: Peer Reviewed Journals

1. Bathula, S., & Korta, K. K. (2019). Mixed ligand complexes of transition metal ions with selective bio-ligands in surfactant-water mixtures. *International Journal of Recent Technology and Engineering*, 8 (2S11), 3182-3190.
2. Bathula, S., & Korta, K. K. (2019). Ternary Complexes of Essential Metal Ions with L-Arginine and Succinic Acid in Cationic Surfactant Medium. *International Journal of Advanced Engineering Research and Science*, 6, 306-314.

Conference Presentations

Preparation and Characterisation of Metallorganic Precursors Derived Iron Oxides on Porous Silicon Layers. Sivakumar Balakrishnan, Yurii K Gun'ko , Gerhard F Swigeggers and Tatiana S Perova. **4th International Conference on Energy Engineering and Smart Materials**, University of Dublin, Ireland, June 30-July 2, 2019.

Collaboration Projects

1. **Designing a Suitable Drying System for Higher Altitude Conditions: Using Gembolg District, Simbu Province as a Model.**
Jointly by FPDA, Applied Sciences and LNSDC This an applied research study to assist Fresh Produce Development Agency(FPDA) and the project serves as MPhil studies

undertaken by Mr Nigel Kiaka and is co-supervised by Reilly Nigo from Unitech and Noel Kuman of FPDA. The work is in final stage , on the ground people are already using the technology which was designed and constructed under Unitech's supervision.

2. **NFA–Unitech – Laboratory Accreditation** – Project leader: Mr. R. Nigo. Around K3.5 million has been allocated to this project. Through the NFA funded the Department of Applied Sciences Building has been fully renovated. Several equipment worth more than K2 million has been purchased. Preliminary accreditation work is in good progress and few industry based tests have been done using HPLC and now two new equipment; namely Gas Chromatography and ICPMS both of the latest models have been commissions and trials runs are in progress. The partnership work has been renewed in November 2019 and collaboration work continues.
3. **Food Safety Courses / Training for Industries** – Coordinator: Mr. R. Nigo. This is a program running in three stages annually. Conducted by the senior Food Technology staff of the department (Mr. R. Nigo, Mrs. R.G. Sipou, Mrs. S. Denano, and Dr. L.Yalaming). The team has written modules and delivered training to various food Industries. The training is becoming popular in food and allied industries and government / semi-government organizations like NAQIA and Department of Health.
4. **One Health Project** – This is a new project Under National Health Department. National Food Testing and Monitoring Centre, Under the Department has been identified as one of the facilities to be upgraded and used to facilitate chemical and microbiological analysis in the country. This to be an ongoing project, to be assisted by FAO and Fleming Fund through the National Department of Health.
5. **Towards National Drinking Water Standards in Vanuatu:** Applied Research and Capacity Building– a collaborative research with reputed Universities of Australia and New Zealand funding by The Pacific Islands Universities Research Network (**PIURN**), Funded by PIURN – Undertaken by Dr Srikanth Bathula. The research is an ongoing study.

Post Graduate projects (2019)

No.	Student	Degree	Topic	Principal Supervisor
1	Kundo HUNDANG	PhD	Studies on Health and Medical Conditions Related to Environmental Effects of Volcano Affected Areas of East New Britain Province of Papua New Guinea	Dr L.Yalambing
2.	Nigel.K.KIAKA	MPhil	Designing a Suitable Drying System for Higher Altitude Conditions: Using Gembolg District, Simbu Province as a Model	Mr Reilly Nigo
3	Carlton GUWANDA	MPhil	Development of Supplementary Food for Malnourished Children.	Dr. Yalambing
4.	Anne ANONG	MPhil	Pollution Studies – Morobe Mines	Dr W.Modey
5.	Nadia TIAGA	MPhil	Fermentation and Quality Studies of Cocoa	Mr Reilly Nigo/Mrs Rag G.Sipou
6.	Dilkay BAU	MPhil	Macro Nutrient Profiling and Product Development Studies of Sweet Potato In PNG	Dr L. Yalambing/ Mr Reilly Nigo
7.	Esther Dujanbi	MPhil	Production of Biogas from Chicken Wastes in PNG	Dr S, Barthula

Completed Undergraduate projects (2019)

Applied Chemistry Section – research projects with final year students

No.	Student Name	Topic	Supervisor
1	DION Denise	The preparation of cellulose based membrane using Cogon grass (<i>kunai grass</i>) as a low cost material for the removal of dye in aqueous solution.	Dr.S.Balakrishnan
2	GILBERT Jacob	Enzyme-mediated formulation of stable elliptical silver nanoparticles and testing against clinical pathogens and multi-drug resistant (MDR) bacteria.	Prof.Gopal
3	KABIU Janita	A quality assessment of different lubricant oils in lae, Papua New Guinea.	Dr.S Bathula
4	KISI Ruthia	Synergistic effect of phytosynthesized silver nanoparticles constructed from aqueous extract of <i>Euphorbia geniculata</i> and two reference antibiotics.	Dr.Timi
5	KU Salvina	Determination of the heavy metal content of <i>Gnetiumgnemon</i> .	Dr.Timi
6	LILIURA Jemeemah	Algal Nanoparticles: Synthesis and Biotechnological Potentials	Prof.Gopal

7	MANUS Renee	Spectrophotometric Determination of Uric Acid in the Bumbu River, in Lae.	Dr.W Modey
8	AULONG Vassula	Design of heavy metal water treatment system using simple, cost effective method and the investigation of the bio-adsorption mechanism through pseudo order kinetic studies.	Mr.PKaupa
9	NGADUB Eva	Sol-gel synthesis of transition metals doped lanthanum phosphate ceramic materials	Dr.S.Balakrishnan
10	RUBA Roger	High-sensitivity Quantitative Spectrometric Determination of Heavy Metals in the Surface Water from the Bumbu River, in Lae.	Dr.W Modey
11	SALANGAT Nimrod	High-sensitivity Quantitative Spectrometric Determination of Heavy Metals in Bumbu River Sediments.	Mr.J Narimbi
12	THOMAS Timothy	Assessment of Microbiological contamination in the Bumbu River, in Lae.	Mr.J. Narimbi
13	WAEWIRO Thressa	Green Synthesis of Nanoparticles from selected medicinal plant and studies on antimicrobial activities.	Prof.Gopal
14	WII Emmanuel	Preparation and characterisation of novel silicon and porous silicon based composite materials	Dr.S.Balakrishnan
15	DAVID Max	A quality assessment of different river water sources for drinking in Lae, Papua New Guinea	Dr.S Bathula
16	DION Denise	Design of heavy metal water treatment system using, simple, cost effective method and the Isotherm equilibrium studies of the of the bio-adsorption mechanism.	Mr.P Kaupa

Food Technology Section – research projects with final year students

No.	Student	Project Title	Supervisor
1	SILTA Anna	Further work on the microbiological quality of Water/Cordial	Mrs Rag Gubag Sipou
2	PALMA Joseph	Product Development Studies of Sweet Potato (Kaukau)	Mr Reilly Nigo
3	MAIANS Champy	Food Nutrition Composition Studies	Dr Lydia Yalambing
4	PAIKAN Fitzgerald	Further Studies of Three Named Cocoa Varieties in Morobe Province	Mrs Sgoing Denano & Mrs Reilly Nigo
5	POYA Phill	Investigating the nutritional quality of meat waste from a canned-beef processing operation for non-food applications.	Mr Nigel Kiaka
6	GAM Albert	Extraction of Virgin Coconut Oil using Enzymatic Process	Mr Zeipy Toksy & Mr Reilly Nigo

7	PUKU Philimon	Further Studies on Microbial Quality of Water and Fish Using Aquaculture Systems.	Mrs Rag Gubag Sipou
8	MALI Wilfred	Further Studies in Biogas and Nutrient Value Profiling of Different Factory Wastes Around Lae City	Mr Reilly Nigo
9	MAULOMU Melsiha	<i>Beta</i> -Carotene Profiling of Known Sweet Potato Varieties	Dr Lydia Yalambing
10	MICHAEL Charis	Quality Assurance/Postharvest Studies	Mrs Sgoing Denano
11	TOMMY Anno	Drying, Quality and Product Development Studies of Morobe Coffee	Mr Reilly Nigo
12	MARTIN Moses	Food Fortification Conformity Studies	Dr Lydia Yalambing
13	WIMA Osa	Product Development Studies from Cocoa in Morobe Province-	Mr Reilly Nigo

DEPARTMENT OF ARCHITECTURE AND CONSTRUCTION MANAGEMENT

Head of Department: Professor Cletus Gonduan, PhD

Research Undertaken and Continuing

Professor Dr. Cletus Gonduan With MPhil. Student Research Davida Thomas in 1.0 Jackson Taviri 5.0	Research works are currently being undertaken <ol style="list-style-type: none">1. User Behavior in Institution Housing: a periodic observation and assessment of indigenous user behavior in PNGUOT housing. 2018 – 2019/20212. Environmental Stress: An assessment of the built environment wear and tear in response to user overload. 2016 - 20213. Shifting Cultural Influence in Domestic Architecture Design in Indigenous Environments and Societies4. Local Fibers with Fiber-Reinforced-Polymer (FRP) as Potential Building Material 2019 - 20235. Portable Design Modules for Remote Rural Health Facilities 2018 - 2021
Dr. Andrew Sariman	Research works are currently being undertaken. <ol style="list-style-type: none">1. Thermal Performance of UNITECH Housing2. Design Faults in Existing Housing3. Climatic Data for Architects in Papua New Guinea4. Effectiveness of Shading Devices5. Design Studio Learning6. Thermal Performance Comparison Between Steel Metal and Traditional Thatched Roofs7. Quality of Concrete Masonry Block Manufactured from Sand Obtained from Sea Shore around Papua New Guinea
Ken Polin	<ol style="list-style-type: none">1. Hybrid Design System for developing state-owned buildings in PNG2. Stakeholder management model for building projects in PNG.
Austin Polin and Prof. Gonduan MPhil. Research 2.0	Research works are currently being undertaken: <ol style="list-style-type: none">1. PNG Vernacular Spatial Domestic Design Experience, “Formal versus Informal” – A Potential knowledge base towards “Melanesian Academia”.2. “Floating Architecture” of the Titan People of Manus - Past, Present & Future

	3. Culture as a Social Indicator in Melanesian Spatial Architecture – A Case Study on Alhoga Village, Misima Island
Mathew Pomoso	Research works are currently being undertaken 2017 – 2018 1. Building Project Management – PNG Experience – Master Thesis UNRE
Magdalyne Kuluwah	Research works are currently being undertaken 2017 – 2018 1. Concrete application ‘ON SITE’ in accordance with design and documentation specification by tradesmen in construction sites.
Cherket Jerry	Thermal Comfort in PNG Urban Domestic Houses.

DEPARTMENT OF BUSINESS STUDIES

Head of Department: Professor Zhaohao Sun, PhD

1 Introduction to DBS

The Business Studies is the largest Department of the thirteen academic departments at the UNITECH with about 600 undergraduate and postgraduate enrolments every year. It is a multidisciplinary Department with proven track records for producing national and Pacific regional leaders and beyond. Our alumni have led PNG's industrial and governmental sectors for decades.

The programs within the DBS make our students easier to build bridges between knowledge, skill, value and practice. The DBS offers undergraduate programs in Accounting, Applied Economics, Information Technology, and Management. It also offers postgraduate programs including PhD programs in Information Technology, Economics, Finance and Banking; Master of Philosophy in Information Technology, Economics, Finance and Banking; Master's in business administration (MBA) and an Executive Masters in Business Administration (EMBA) program. DBS is developing the comprehensive postgraduate programs including masters of IT, Accounting and Economics, and PhD programs in Accounting and Management. The programs of the DBS currently aim to drive various aspects of PNGUoT and national strategic visions and development efforts, as well as regional and global competitiveness, innovation and entrepreneurship in an increasingly complex business environment.

The faculty is staffed by a dedicated, nationally and internationally recognized team of academics whose teaching is innovation, entrepreneurship and digital technology driven and supported by their active involvement in relevant industries, professional associations. Academic staff have an established research record with a commitment to conducting competitive research with national and international reputation.

The DBS has a Research Centre of Big Data Analytics and Intelligent Systems (BAIS) and a Centre of Innovation and Entrepreneurship (CIE). As a research platform for collaborating with our colleagues here and international peers to conduct research in the areas of big data, big data

analytics, AI, business intelligence and intelligent systems, BAIS disseminated ITCS-BAIS Vol 7, Issues 1-4 to its team to share the state of art big data analytics, data science, AI and intelligent systems in 2019. BAIS has its presence at <https://www.researchgate.net/lab/Zhaohao-Sun-Lab>. In 2019, BAIS published 12 Preprints (Working papers) on big data, AI, big data analytics, business intelligence and intelligent systems at <https://www.researchgate.net>, 5 of them have been indexed by Google Scholar. BAIS has drawn increasing attention in the international academia.

DBS is building a PNG –China Centre of Business Studies, a PNG-Australia Centre of Governance and Policy Development and a Student Centre of Digital Innovation.

DBS is committed to providing our students with excellent education opportunity using state-of-the-art ICT technology and equipment. The faculty pursues excellence in teaching/learning, research, consultancy and community service supported with innovative and interactive blended technologies. Our faculty also engages in research and development that helps understanding of nature and improvement of the ever-changing world.

The DBS has a close cooperation relationship with many universities of other countries including Federation University Australia; Handong University, Korea; Hebei University of Science and Technology, and Chongqing Normal University, China.

Research across the four main disciplines represented in the Department of Business Studies is encouraged: Economies, Management, Information Technology, and Accounting. The following research activities were undertaken by academic staff members in the Department of Business Studies during 2019 Academic year: The report demonstrates that 1. Comparing with 2018, the number of publications has increased from 4 to 10, almost all of them have been indexed by SCOPUS or ERA or ISI (SCI). The main contributors for research outcome of DBS are four academic staff members, similar to those in 2017, and 2018. However, many academic staff at DBS have no record of publications, nor attending national and international academic conferences, nor deliver any research seminar presentations in the past four years (2016-2018). Therefore, how to activate, reactivate and encourage the research passion of academic staff and increase outcome of quality research taking into account SCOPUS, ERA or SCI (WoS), as well as Google Scholar is still a big and lasting challenge for DBS. The research performance of academic staff is an

important index for any international or national accreditation of undergraduate and postgraduate programs, not only for teaching at universities.

2 Research Outcome

2.1 List of Publications in 2019

In 2019, DBS published 2 books, 4 book chapters, 3 peer-reviewed (refereed) international journal articles, and 1 peer-reviewed international conference proceedings paper. This summary is based on the National Data Collection Standards of Australia.

2.2 Published Books/Book Chapters

1. Blayney, P., & Sun, Z. (2019). Using excel and excel VBA for preliminary analysis in big data research. In Sun Z (ed) *Managerial Perspectives on Intelligent Big Data Analytics*. IGI-Global, USA, pp. 110-136. (Scopus)
2. Huo, Y., & Sun, Z. (2019). *China's Socioeconomic Transformation: A Perspective of Grassroots*, Lambert Academic Publishing, 192 pages, ISBN 978-620-0-27684-1*
3. Strang, K., & Sun, Z. (2019). Managerial controversies in artificial intelligence and big data analytics, In Sun Z (ed) *Managerial Perspectives on Intelligent Big Data Analytics*. IGI-Global, USA, pp. 55-75. (Scopus)
4. Sun, Z. (2019). *Intelligent Big Data Analytics: A Managerial Perspective*. In Sun Z (2018) *Managerial Perspectives on Intelligent Big Data Analytics*. IGI-Global, USA. pp. 1-19. (Scopus)
5. Sun, Z. (2019). *Managerial Perspectives on Intelligent Big Data Analytics*. IGI-Global, USA, editor and author. ISBN13: 9781522572770, 335 pages, February. (Scopus)
6. Sun, Z. (2019). Preface, in Sun, Z. (2019). *Managerial Perspectives on Intelligent Big Data Analytics*. IGI-Global, USA, pp. xv-xx. (Scopus)

2.3 Published Journal Articles

1. Muhammad Adeel Talib, Muhammad Nabeel Talib & Madiha Akhtar (2019). Service Packaging: A Pattern Based Approach towards Service Delivery. *Journal of Computer and Information Science*. Canadian Center of Science and Education, 12 (2), 14-35. URL: <https://doi.org/10.5539/cis.v12n2p14> (ERA Indexed)
2. Strang, K., & Sun, Z. (2019). Hidden big data analytics issues in the healthcare industry. *Health Informatics Journal* (SAGE), DOI: 10.1177/1460458219854603. published online in July 2019 (WoS, Scopus)
3. Sun, Z., & Huo, Y. (2019). The spectrum of big data analytics. *Journal of Computer Information Systems*. DOI. 10.1080/08874417.2019.1571456. Online published on 12 Feb 2019. (WoS, Scopus)

2.4 Published Conference Articles

- [1].Sun, Z., & Huo, Y. (2019) A Managerial Framework for Intelligent Big Data Analytics. ICBDS 2019, January 10-13, 2019, Bali, Indonesia. Proceedings of ICBDS 2019, ACM International Conference Proceeding Series, pp. 152-156. (SCOPUS)

2.5 Research Thesis Completed

Dr Ramasamy Adimuthu had successfully received his PhD degree from the University of Madras, India. The effective date of the award is 19th Nov 2019. The title of his PhD thesis is “A study on quality of work life of employees (with special reference to ICF, Chennai)”

2.5.1 International Research Seminar Presentation

2.5.2 UNITECH Research Committee Seminar Presentation

2.5.3 DBS Research Seminar Presentations

Seminar Presentation 2019

<i>S. No</i>	<i>Date</i>	<i>Name</i>	<i>Topic</i>	<i>Venue</i>
1	20.03.2019	Mr. Anthony Anugu	Topic: Forecasting uncertainty using Monte Carlo Simulation model and Real Options to abandon a new project- A risk analysis simulation based on Real project using 20,000 random variables.	EMBA Room 1
2	27.03.2019	Mr. Anthony Anugu	Carbon Emission and its impact on Cost of Capital in Australian Material and Utility Industries – A review Case Study	EMBA Room 1
3	18.07.2019	Dr.Tindi Seje Nuru	Interrogating the rigor of the five point format in Business Research - Implications for PNGUoT.	EMBA Room 1
4	25.09.2019	Mr.Gomi Gipe	Relationship between Income and Expenditure in ‘Economic Development’: A Case Study of the Fourth Year Applied Economics Students, in the Department of Business Studies, University of Technology, 2019.	EMBA Room 1

5	09//10/2019	Mr. Anthony Anugu	Risk free Rate of return on Government Bonds and treasury bills & Yield Curve- A Case study Analysis	EMBA Room 1
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3 National and International Engagement (Outreach)

3.1 Editing Journal & Other Research Activities

1. Prof Sun has been editing a new book on intelligent analytics since November (<https://www.researchgate.net/project/Intelligent-Analytics-with-Applications>). This book will be released by IGI in the end of 2020.
2. As a member of PC, Prof Sun has been actively engaged in organizing international conferences including ICBDS 2019, ICE-B 2019, i3e 2019 (Norway), CONFENIS 2019, SMC 2019, ICAART 2019, ACSW (and HIKM) 2019, ITS 2019, etc. he has reviewed a number of papers for each of them.
3. Prof. Sun is member of the Editorial Advisory Board (EAB) for the edited book titled “Opportunities and Strategic Use of Agribusiness Information Systems“, IGI Global (www.igi-global.com). The editor is Ferdinand Che ferdinand.che@gmail.com, Oct 2019.
4. Prof. Sun has been servicing on the Editorial Board of Journals
 - Editor of Journal of New Mathematics and Natural Computation (<http://www.worldscientific.com/worldscinet/nmnc>).
 - Associate editor of Journal of Intelligent and Fuzzy Systems
 - Associate editor of International Journal of Systems and Service-Oriented Engineering (IJSSOE).
 - Associate editor of International Journal of Business Intelligence Research (<http://www.igi-global.com/journal/international-journal-business-intelligence-research/1168>).
 - Associate editor and Strategic Advisor of International Advisory Board (IAB) at International Journal of Risk and Contingency Management (IJRCM).

3.2 Visiting other universities

As an adjunct professor of Federation University Australia, Prof Sun visited Federation University Australia in January 2020 and collaborate with Professor Andrew Stranieri there for and developed 3 research papers in intelligent analytics and knowledge discovery.

As an adjunct professor of Hebei University of Science and Technology, Dr Sun visited there in November to December, 2019 and discussed cooperation with them in e-commerce and big data areas.

Prof Sun also visited MIT, Melbourne, Hebei Normal U (discussed with Dean, Prof Shuliang Zhao for collaboration in Dec 2019). Virginia U of Science and Technology (VUST) and discussed with President Dr Ma and Prof Li Chen Zhao for collaboration (21 12 19) , College of William and Mary, VA (second oldest higher institution of USA) (25 12 19), Virginia Commonwealth University (VCU) (28 12 19), Johns Hopkins University, MD (01 01 20), St John's College, MD founded in 1896 (3rd oldest higher institution of USA) (04 01 20), United States Naval Academy, Annapolis, MD (04 01 20)

3.3 Consultancy

- Prof Sun was invited to complete annual QS Global Academic Survey at https://qsnetwork.az1.qualtrics.com/jfe/form/SV_74AsDQ3ilwx3Ybz?Q_lang=EN&Root=IBIS. It asked him to Best Research in Engineering & Technology. Please select: up to 10 domestic (Papua New Guinea) universities and up to 30 international universities that you regard as producing the best research in the Engineering & Technology subject area

3.4 Organize and attend National/international conferences

As a Steering committee, Prof Zhaohao Sun has organized 13th Australasian Conference on Health Informatics and Knowledge Management (HIKM), Sydney, February 2019 <http://www.hikm.net.au>.

3.5 Journal reviewers

Prof Sun reviewed a number of papers in 2019 for the following journals

- Access (Elsevier)
- Computer Networks (Elsevier)
- Journal of Intelligent and Fuzzy Systems (JIFS)
- IEEE Transactions on Data Engineering (TKDE)
- J of Big Data
- European J of Education Research
- **IJCRM**

DEPARTMENT OF CIVIL ENGINEERING

Head of Department: Dr. Mirzi L. Betasolo

The Department of Engineering offers Undergraduate and Postgraduate Degrees in Civil Engineering. There are four (4) postgraduate programs that the Department is offering, which include Master of Engineering in Civil Engineering (MEng.CE), Master of Science in Solid Waste & Resource Management (MSc.SWRM), Master of Philosophy (MPhil), and Doctor of Philosophy (Ph.D.). The MEng (CE) and MSc. SWRM programs have a combination of course work and research-based degree programs, while MPhil and Ph.D. studies are fully research-based degrees. The undergraduate program consists of a four-year study program- Bachelor in Engineering in Civil Engineering (BECV). The undergraduate program is now on its accreditation process to the Washington Accord.

The Department has nine (9) qualified academic staff (4 with PhDs, 2 with Master's Degree and 3 for further studies). There were two (2) students pursuing the degree of MPhil. There were 183 (49 year 1, 37 year 2, 49 year 3, 48 year 4). Graduating class for 2019 are 47 students.

The Department of Civil Engineering is committed to delivering the seven strategic domains. Equipping our classroom with the modern teaching tools such as an in-place overhead projector in each classroom and fully utilizing the University Learning Management System (LMS) is one of those strategies that the Department pursue. Research, innovation, and training is the third of the Strategic Domain of the University. For this reason, both undergraduate and postgraduate have research components. We commit to deliver Strategic Domain 7 (Community, Industry, and International Partnerships) for outreach activities where the Village of Busama and its needs in water supply and shore protection had been attended through meetings and consultation.

Our commitment to foster the training of our graduates is reflected in an increase of postgraduate students. We had, for the first time, undertook an in-house industrial training for ten (10) Civil Engineering Students, which two (2) comes from year 3, and the rest comes from year 4.

The commitment in research is reflected in the publication of the Global Journal of Civil Engineering published officially on 4 July of 2019. The 18 final year projects is another milestone in our research endeavor. Below is a list of our Research Facilities.

RESEARCH FACILITIES

The Civil Engineering Department is housed in four main buildings containing research laboratories, a separate workshop and a field laboratory. These research laboratories are:

- Structural Laboratory

- Hydraulics Laboratory
- Geotechnical Laboratory
- Concrete Laboratory, and
- General Workshops:
 - Welding
 - Carpentry
 - Fabrication
- Field Laboratory (CRI-Yalu Site):
 - Asphalt Laboratory
 - Cement Testing Laboratory
 - Concrete Test Laboratory

The Field Laboratory is supported with the Memorandum of Understanding finalized in the year 2014 with the China Railway International (CRI), who are contracting the four-lane road project from Nadzab Airport to Lae. The partnership of the industry working on the major road of Morobe allows the Department of Civil Engineering to have an extended laboratory research facility on Asphalt and Concrete Plant. The department laboratory also operates on a commercial work to the serve industry. The laboratory equipment, mechanical equipment, such as testing machines, pressure and force measuring devices and torque wrenches are calibrated by NISIT regularly. It also offers a comprehensive range of material testing for soils, concrete and metals.

The research subjects being investigated in the Department include Concrete innovations, Material Resources, Cable Stayed Bridges, Steel Structures, Timber Structures, Sewage Lagoons, Roads Pavement Materials, Earthquake Resistant Structures, Soil Properties, Disaster Research, Accident Analysis, Pavement Design, Cost-Benefit Criteria for Developing countries, Rural Water Supply and Sanitation and Waste Management, and Engineering Education.

STAFF RESEARCH INTEREST

1. Dr. Mirzi Betasolo List of Research Agenda:

Present Research Work	Future Research Interest
RVA (Rabaul Volcanic Ash) Cement	1. Basic and Advance Construction Materials The objective is to achieve a comprehensive technical development of basic and advanced materials using latest materials technologies based on the condition of the limitation of our resources and energy, to enable a sustainable development of society. To include but not limited to study of materials related to composite structures, steel structures design, use of aluminium in building components and timber as a composite material in structure. I
RVA Hollow Block	
Investigation on asphalt roads early failure in PNG	
Fiber reinforced concrete	

	am also interested in incorporating nano technology to advance materials engineering and structure components. 3D printing methodology may also be incorporated in the advance construction materials theory for cost and production effectiveness.
Energy Efficient Public Buildings in Papua New Guinea	2. Energy-saving building component My interests in the energy-saving building component developments include the following: Light-controlling glass, wood-based window sashes, and humidity controlling walls, which can significantly reduce the energy required for air-conditioning of buildings, thus help in the growth of climate change. In addition to this, a design of air flow to minimize energy use is another interesting research agenda.
Bioenergy	
Biowaste management	
Material engineering sustainability	3. Countermeasures in response to concerns about shortage of metal resources Lack of metals availability in the future due to increasing demand and extreme unevenness in the distribution of underground resources interests me. Thus, developing an innovative metal from waste recovery is among my interest.
Recycling of Waste Paper in the University for Construction Material	4. The development of environmentally friendly construction materials. My interest in the development of green building materials includes recycling of plastics, paper, tin, wood dust, slug and other waste either for architectural or structural use.
	5. Development of sustainable engineered lightweight construction material for use in residential building My goals in the development of sustainable engineered lightweight construction materials is for use in economical residential building to includes materials such as shale resources, metals, other resources for similar use.
Bridge Health Monitoring	6. Other interest in construction engineering includes structural health and monitoring research Structural stability such as analysis and design are of my interests to include health monitoring
Groundwater sustainability	
Seismic Resilient Structures	
Ground Stability	

	of structures for early warning on disaster to happen and for recommendation on building refurbishment.
Rainwater harvesting	7. As the need arises As the need arises applies when my interests are not the best interest of the University or the company I am working for. As their employee I am in support to pursue what they seems best.
Drainage System, its impact in road infrastructures	
GHG Monitoring in Lae	
Waste Management	
Paradigm Shift Learning in PNG	

2. Mr. Christopher Kobal

My research interests are as follows:

1. Coconut timber as a structural material - Results of tests carried out so far are yet to be analysed. More tests will be done for a more complete job. These are expected to be submitted for inclusion in our Timber design code where coconut timber is absent, so at the moment Engineers are not confident enough about utilising the vast amount of timber potentially in the coconut plantations around PNG.
2. Treatment of Stormwater for use for recreational purposes. Children play in running streams which are far from being clean. Larger waterways such as the Bumbu river also need to be investigated as residents in the vicinity use it for washing themselves and their clothes and so on.
3. Performance of timber/wood glued connections have been done using the traditional glues. With the advent of new and better-quality glues, these need to be tested for their performance with PNG timbers.

LIST OF PUBLICATIONS

A. Non-Indexed Journal

Betasolo, M., & Dromenge A. (2019). Strengthening Rabaul Volcanic Ash (RVA) Cement Compressibility with Addition of Lime. *Global Journal of Civil Engineering*, Vol. 1, No. 1 July 3, 2019. Papua New Guinea University of Technology. Available at SSRN: <https://ssrn.com/abstract=2971147>

Ambranga, M., Fincham, R., & Betasolo, M. (2019). A Comparative Evaluation of the Structural Performance of Papua New Guinea River Gravel Using the Repeat Load Triaxial (RLT)- a Performance-Based Test. *Global Journal of Civil Engineering*. Vol. 1, No. 1 July 3, 2019. Papua New Guinea University of Technology. Available at SSRN: <https://ssrn.com/abstract=3084408>

Betasolo, M., Lageo, A., Kasai, W., Kathoa, R., Kipit, W., & Kueyak, S. (2019). Polypropylene Fiber (Disposable Plastic Cups) Reinforced Autoclaved Concrete. *Global Journal of Civil*

Engineering. Vol. 1, No. 1 July 3, 2019. Papua New Guinea University of Technology Available at SSRN: <https://ssrn.com/abstract=3085379>

Sultan, Z., Obu, I.F., Kana, S., & Joseph, J. (2019). Subsidy for Public Transport in Developing Countries – A Case Study of Lae, PNG (June 14, 2019). *Global Journal of Civil Engineering*. Vol. 1, No. 1 July 3, 2019. Papua New Guinea University of Technology. Available at SSRN: <https://ssrn.com/abstract=3119616> or <http://dx.doi.org/10.2139/ssrn.3119616>

Carcano, E. (2019). Modelling Design Hydrograph for Small Catchment: A Case of Rupinaro River. *Global Journal of Civil Engineering*. Vol. 1, No. 1 July 3, 2019. Papua New Guinea University of Technology. Available at SSRN: <https://ssrn.com/abstract=3106000> or <http://dx.doi.org/10.2139/ssrn.3106000>

Billy, B., Paru, J., Masti, L., and Malo, H., & Betasolo, M. (2019). Application of Queuing Model in a Banking Service in PNG. *Global Journal of Civil Engineering*. Vol. 1, No. 1 July 3, 2019. Papua New Guinea University of Technology. Available at SSRN: <https://ssrn.com/abstract=3108466> or <http://dx.doi.org/10.2139/ssrn.3108466>

Sultan, Z., Bomoteng, J., Philemon, M.P., Yalehen, A. (2019). Public Transportation Improvement in PNG - A Case Study of Lae City. *Global Journal of Civil Engineering*. Vol. 1, No. 1 July 3, 2019. Papua New Guinea University of Technology. Available at SSRN: <https://ssrn.com/abstract=3137404> or <http://dx.doi.org/10.2139/ssrn.3137404>

Conferences/Workshops/Training

Name of Staff	Date	Place	Training Title
Dr. Mirzi Betasolo	17-18 January 2019	Tacloban City, Philippines	Training Workshop on "Disaster Mitigation, Preparedness and Response", A special Training Module for DMPR Structural Safety Evaluators
Dr. Mirzi Betasolo	30 May- 1 June 2019	Manila, Philippines	19th ASEP International Convention (19AIC) on "Structural Engineering for Infrastructure Resilience"
Dr. Mirzi Betasolo	22 Oct 2019- 4 Nov 2019	Beijing China	Training Courses Programs on Climate Change and Green & Low-Carbon Development
Ms. Grace WANTEPE	17 Nov 2019 3 Dec 2019	Beijing China	Training Courses Programs on Climate Change and Green & Low-Carbon Development
Mr. Murray Konzang	17 Nov 2019 3 Dec 2019	Beijing China	Training Courses Programs on Climate Change and Green & Low-Carbon Development

Unitech Seminar Presentations 2019

Name of Staff	Abstract #	Title of Presentations
Dr. Mirzi Betasolo	2	Application of a culture-educational paradigm shift learning (CEPSL) Model
Dr. Elena Carcano	4	A Method to Assess Contextually Stream Flow Rating Curves and Sequences
Prof. Primus Mtenga	8	Bridge Infrastructure Network Maintenance Prioritization under Extreme User Scenario

Postgraduate Research Completed

Mr. William Pikire, who passed away last year have completed his requirements and is requested for an Posthumous Graduation

List of Postgraduate Thesis 2019 Presented

Name	Supervisor	Program	Research Title
Grace WANTEPE	M. Betasolo	MPhil/2	Health Monitoring of Steel Girder Bridge: A case study of Bumbu&Butibam Bridge of Lae City
Jedge KASADIMI	R. Subramanyam	MPhil/1	Heavy Metal Contaminated Soil and Remediation techniques in PNG
Charles FERIWOK	M. Betasolo	MScSW RM/2	Rehabilitation of a 49 yr-old Sewage Pond
Willie DOAEMO	M. Betasolo	MScSW RM/2	Water Resource Assessment for Lae City Urban Development
Nathaniel DASYAL		MScSW RM/2	Investigation into phytoremediation characteristics of seven selected plant species being used in the Tailing Waste Rehabilitation Trials

Workshop Organized

National Workshop on Environmental Impact Assessment (EIA) OO Mining industries,
November 04-05, 2019

Final Year Undergraduate Research Projects

Table 2. Research work undertaken by fourth year BECV students as a partial fulfillment of the Bachelor's degree program in 2018

No	Name	Supervisor	Title of the Research Project
1	Puri TEMU; Benjamin ASIRI; Mischelle. MANEIPURI; Jason. KINAMUN	Dr MirziBetasolo	The Investigation into the Capacity of Dynamic Commercial Structures when subjected to EQ loads based in Rabaul.
2	C.S. HAVIRI; J. POKA; F. WATIR	Dr. Subramanyam	Physico-chemical characterization of municipal solid waste from Lae city of Papua New Guinea- a case study for its sustainable utilization.
3	E. PEDRO; JoeTENGDU; Brynne. RUMMINTS	Mr. Konzang	Reconstruction of Garia River Bridge at Zumin Village
4	M. WAMUGL; M. Kawage; M. Dango	Mr. Kobal	Design of new bridge over Yogaima River
5	Jerry SUKUTAO; Nelson SOTO& Newman NICK	Dr Mirzi Betasolo	Investigation into Pavement Failure along Malahang Industrial Centre (MIC) Road for Sealing
6	OlemaVARO and HaimeOMI	Dr. Subramanyam Mr. Kasadimi	Geotechnical properties and Hazardous Mine – Contaminated soil in PNG and types
7	W. JONES	Mr. Kasadimi	Design of rural water supply – Weimog Monigrin
8	N. STANLEY; T. MANAPE	Mr. Konzang	Stability Analysis of river protection embankment along Rumu River
9	T. TAKOM; S. ANANIA	Mr. Kobal	Design Proposal for the redevelopment of the Lae Rugby League Stadium
10	S. PEPA and J. WAI	Mr. Konzang	Upgrade and sealing of rural road – case study Baiyer River Bridge
11	Gibson KAMBA, Daniel SAP & Joshua NICHOLAS.	Mr. Konzang	Evaluation of Existing Sipaia Road for an Optimum Pavement Design, Cost and Method of Construction in Lae, Morobe Province.
12	Jeremiah KELEINO, Jeremiah YAPIS & Ben Junior KASILA	Dr Betasolo, Mr Nosare Maika (ATCDI)	Feasibility Study of Qoya Mini Hydro Power Scheme on Qoya River in Kâte LLG of Finschhafen District, Morobe Province'.
13	M. VEGOLI; K. ANOTA; L. YUAMBARI; C. Rodney	Mr. Tiaga	Investigation into the application of EVM on construction projects: A case study of building projects for the purpose of IEPNG village.

14	Kelly MUVE & William AITEN	Mr. Konzang	Parametric Study and Design of Culverts and Gabion Retaining Wall to Replace Temporary Bailey Bridge at Gohuloka – Eastern Highlands Province
15	Philemon SAUAN Nathaniel TIMOTHY Kenny KOMBA	Mr. Konzang	Design of Bumbu's Embankment Protection Wall.
16	Lapason STEVEN & Kenneth TOBAWI	Mr. Konzang	Investigation of Pauanda Hydropower Plant Soil Movement in Forebay Area.
	Tony RANDE, Joel RAWUTH, Jephth ANDREW	Mr. Konzang	Kassam Pass slope stability and slip control
	Andy RAPHAEL	Mr. Kobal	Improving Pipe Hanger at Porgera Underground Mine

DEPARTMENT OF COMMUNICATION AND DEVELOPMENT STUDIES

Head of Department: Associate Professor Garry Sali, PhD

As concerns *teaching activities*, the Department offers a 4-year professional program and has two sections: A Communication for Development (C4D) Studies and a service-course sequence in English for Academic Purposes (EAP) for students across all disciplines of the University; and, a professional program Communication for Development degree program to train liaison and community development and public relations officers for resource development companies, government departments and non-government organizations. It also presently administers the Postgraduate Certificate Course in Student-Centered Teaching for the further specialized training of academic staff at PNGUoT.

In 2009, the Department began offering a Masters in Communication Studies (MCS) program. This program has both a course work and a dissertation component, where the students write a research paper on an appropriate topic in the final semester of their second year. In addition, a Masters of Arts in Organizational Leadership is offered in Cooperation with Development Associates International (DAI), The Christian Leadership Training College of Papua New Guinea (CLTC), and the Pioneers of Australia. Furthermore, a growing PhD program is underway, with one graduate to date and two others currently enrolled.

As concerns *research activities*, the Department of Communication and Development Studies at the Papua New Guinea University of Technology is a department that blends three broad academic strands (Language and Communication Studies, Sociology, and Communication for Development). Through its individual members of staff, research is conducted in under general umbrellas (Linguistics and Culture, English for Academic Purposes/EAP, English for Special Purposes/ESP, Sociology, and Communication for Development). General and sub-topics include:

In Linguistics and Culture, focus is given to PNG national languages, comparative linguistics, and the interface between society and language across time. In EAP or ESP, research topics include: classroom research, EAP/ESP methodology, course design, material design, genre analysis, rights analysis, critical EAP/ESP, reading and writing, testing and evaluation, computer-mediated language learning, EAP/ESP research, and socio-linguistic influences on the teaching and learning of EAP/ESP.

In the general area of Sociology, research foci include fieldwork, health, corrections, communication theory and practice, media studies, critical-cultural studies, and comparative higher education studies. Another thread is concerned with the problems of youth in society, especially on topics such as integration, sex education, and social behavior.

In the Communication for Development (C4D) area, the sub-topics of research interest include: communication in education, communication and gender, communication in resource management, conflict resolution, negotiation skills, partnership building, communicating development in such sectoral contexts as economic industries, healthcare, agriculture, and so forth, democracy and human rights, and HIV/AIDS.

Both empirical (quantitative) or qualitative approaches to relevant topics are employed by our academics, with trans-disciplinary innovations (such as action research) encouraged. The Department publishes a peer-reviewed organ, the *JCDS: Journal of Communication and Development Studies* in cooperation with the UNESCO Chair of Quality Management of Higher Education and Lifelong Learning of "Lucian Blaga" University of Sibiu, Romania, and its Director, Prof *habil.* Dr Silvia Florea.

Name of the Faculty Member/Position/Research Interests

Name of the Faculty Member	Position	Research Interest
Dr Eric Gilder	Professor	Higher education policy, scientific communication, technology and society, communication theory and practices across intercultural contexts, radio-TV history and legal aspects of broadcasting and the socio-psychological aspects of the communication process.
Dr Golam S. Khan	Professor (until June)	International migration, urbanization, health sociology, political economy, research methodology (qualitative) and family dynamics.
Dr Garry Sali	Associate Professor and Head of Department	Sociology of crime and deviance, prison systems, crime and development, and law and order problems in PNG.
Dr Rachel Aisoli-Orake	Senior Lecturer	English as a Second Language writing, Education/English curriculum and pedagogy, English for Academic Purposes, Cross-Cultural communication, development and responsibility and participatory research.
Dr Apoi Yaraepa	Senior Lecturer	Linguistics and Applied Linguistics: Language documentation, discourse analysis, language education, production of learning materials for language at all levels (Elementary, Primary, Secondary

		and tertiary institutions), cross-cultural communication strategies, curriculum research, design, implementation and evaluation, English language development in PNG schools.
George Wrodimi	Lecturer	Social work; social policy and planning; social mapping; community development;
Mary Kunenda Aisi	Lecturer	Development communication, gender and leadership, and mass media.
Imelda Ambelye	Lecturer	Education and community empowerment (women and youth), natural resources (mining and other extractive industries) in PNG.
Dr Francis Essacu	Lecturer	Natural resource management and environmental governance, Conflict Resolutions, Peace building and Human Rights, Sustainable Development Projects Management, Sociology of Development, Development Policy, Development Leadership & Politics and Community Development - Gender inequality and Social Inclusion, Disaster Risks Managements.
Joshua Frank Kuri	Lecturer	Language development and practices via bilingual education; practices and effects

		of communication across developing societies.
Sheryl S. Makara (on study leave)	Lecturer	Emotional intelligence and leadership, critical thinking, communication in crime and sociology with relations to development, community development and participation.
Wilma Molus (on study leave)	Lecturer	Sociology of children, sociology of deviance and crime.
Michael Winuan	Lecturer	Enrolled in PhD Program (Year 3). Research Topic: “Means by which agricultural messages are communicated to farmers: A case study of OPIC and small-holder oil palm out-growers at Buvussi and Sarakolok sub-divisions in West New Britain Province” (Eric Gilder & Apoi Yaraepa, Supervisors).
Rhonda Lakele Eva-Gwale	Principal Technical Instructor	Information management, traditional knowledge, changing societies and gender issues. Graduate of Masters in Organizational Leadership (MAOL) Program.
Lucy Maino	Lecturer	Participatory development communication (PDC) whereby communication processes, techniques and media are used to engage stakeholders (individuals, groups, and institutions) in socio-economic change processes, cross-cultural communication, communication for

		agricultural innovation, participatory social mapping, community development, English for academic purposes.
Ngawae Mitio	Technical Instructor	Local community affairs/local governance.

Ongoing International Partnership Research Projects:

Aisi, M. (co-researcher). “The project entitled ‘Addressing family and sexual violence in Lae: the potential of a family centred approach’, built upon a pilot study conducted in 2018, which examined the relationship between women’s experience of seeking support for family and sexual violence (FSV) and their children’s wellbeing and opportunities for education in Lae, PNG’s second largest city.

In the 2018 pilot study, Dr Michelle Rooney (ANU Crawford School of Public Policy), Associate Professor Miranda Forsyth (ANU School of Regulation and Global Governance (RegNet)), Mary Aisi (UNITECH) and Dr Dora Kuir-Ayius (UPNG), identified links between the way women respond to family violence and their economic situation, as well as evidence indicating that the violence women experience, can in many cases lead to inter-generational family violence and cycles of poverty.’

“With colleagues from UPNG and the Australian National University, research was conducted from 2018 to 2019 to understand men’s and women’s perspectives on FSV [Female Sexual Violence] in Lae. This study has explored the ability of families to address FSV in their lives, including a focus on how families keep their children in school when experiencing FSV”. (See: <http://regnet.anu.edu.au/news-events/news/7677/joint-research-project-anu-upng-and-unitech-addresses-family-and-sexual>). As noted there, one seminar was held on an outcome, Goa, J. & Lawihin, D. (2019). “Men’s perspective on options for family, community, service, and police roles in preventing, addressing and mitigating the impact of FSV in families in Lae, PNG”, with co-researchers from ANU and UPNG, at the Development Policy Center, at ANU on 12 November 2019.

Yarapea, A. (Coor.). Papua New Guinea languages documentation project – Partners: PNG University of Technology and USA Living Tongues Institute of Endangered Languages.

Peer-Reviewed Publications:

Journal Issue:

Gilder, E. & Martin, A-S. (LBUS). (2019/2018). *JCDS: Journal of Communication and Development Studies* Volumes V-VI. ISSN 1992-1322. (v-85 pp.). Published in cooperation with the UNESCO Chair in Quality Management of Higher Education and Lifelong Learning, “Lucian Blaga” University of Sibiu, Romania.

Journal Articles:

Essacu, F. (2019). Tribal plurality and cultural inflexibility in Papua New Guinea: A land of mystery and magic. *International Journal of Current Research*, 11(11), 8215-8220.

____. (2019). Interrogating community leadership governance augmenting natural resource development: A Prologue for Papua New Guinea. *Language and Linguistics in Oceania*, 11, 19-35.

____ & Khan, G.S. (2019). Sociocultural relationships in a rural electorate of Papua New Guinea: An observation on the post- election phase of a chaotic political environment. *New Zealand Online Journal of Multi- and Interdisciplinary Studies*, 1(3), 92-122.

Khan, G.S. & Essacu, F.B. (2019). Women's forced obedience and dependability to men in PNG: A scenario analogous to domestic slavery. *International Journal of Current Research*, 11(5), 4205-4208.

Book Chapters:

Ambelye, I. (2019). Youth's displaced aggression in rural Papua New Guinea. *Pacific youth: Local and global futures*. Lee, H. (ed.). Pacific series. Acton ACT: ANU Press (pp. 183-202).

Conference Proceedings:

Sali, G., Betasolo, M. & Gilder, E. (2019). Creating and maintaining a secure and safe environment on a challenged civilian university campus in Papua New Guinea. *Conference Proceedings 2 of the Knowledge--Based Organization: The 25th International Conference (Economic, Social and Administrative Approaches to the Knowledge-Based Organization)*, "Nicolae Bălcescu" Land Forces Academy Publishing House, Sibiu, Romania, 2019 (pp. 189-96).

Lovo, R., Renagi, O., Olatona, D. & Gilder, E. (2019). Renewable energy technologies as 'saving graces' for Pacific Island nations fighting climate change. *Conference Proceedings 3 of the Knowledge--Based Organization: The 25th International Conference ("Applied Technical Sciences and Advanced Military Technologies")*, "Nicolae Bălcescu" Land Forces Academy Publishing House, Sibiu, Romania, 2019 (pp. 117-25).

Critical Collection of Essays:

Gilder, E. (2019). *Reflective essays on changing society and selves across time*. Sibiu [RO]: Techno Media Press, 2019, ISBN 978-606-616-362-0.

Student Textbook of Readings:

Gilder, E. (2019). *Topical argumentation practice: Selected historical readings in post-war commercial radio broadcasting in the United Kingdom*. Sibiu [RO]: Techno Media Press, 2019, ISBN 978-606-616-361-3.

Other Publications:

Aisi, M.; Rooney, M. N.; Forsyth, M.; & Kuir-Ayius. D. (2019, February 6). FSV, children's school attendance and strategies used by schools to help. From <http://www.devpolicy.org/fsv-childrens-school-attendance-and-strategies-used-by-schools-to-help-20181210/>

Scholarly Presentations:

Aisoli-Orake, R. et al. (2019). Women in higher education: A case of the Papua New Guinea University of Technology. Presented at the Impact Conference – “Research, Innovation & Society”. Co-hosted by the University of Papua New Guinea and James Cook University at UPNG Waigani Campus, Port Moresby (PNG), 3-4 December.

Aisoli-Orake, R. & Ambelye, I. (2019). Burial rituals in the Kara and the Melpa Societies of PNG: A contrastive analysis. Presented at the Communication & Development Studies (CDS) Dept. Research Seminar, PNGUoT, Lae (PNG), 26 September.

Sali, G. (2019). Research as key tool for crime prevention to create a safer society for better livelihoods in PNG, Momase Regional Forum on “Crime Prevention to Create a Safer Society for Better Livelihoods”, Vanimo, East Sepik Province, April.

Sali, G. (2019). Capital punishment: Will it reduce the law and order problems in Papua New Guinea or not?, PNG Updates at the School of Business and Public Policy, UPNG, Port Moresby, 7-9 August.

Sali, G. & Gilder, E. (2019). Craving reconciliation: Food exchange practices as a means to carve peace among competing tribes in Papua New Guinea. “Craving Planet Earth: Food in Culture - Past, Present and Future,” International Conference, Department of German and Anglo-American Studies, Lucian Blaga University of Sibiu, Romania, 7-9 November 2019. (second author presented)

Yarapea, A. (2019). Discourse structuring devices of Kewapi language of Papua New Guinea. Linguistic Society of Papua New Guinea, 52nd International Conference, “Promoting Unity in Diversity: Celebrating the Indigenous Languages of the South Pacific”, Hosted by the University of Papua New Guinea in partnership with UNESCO, Laguna Hotel, Port Moresby, 22-24 September, 2019.

Postgraduate Research Supervision/Examining

External

Year	PhD Candidate	Research Title	Co-adviser	Institution
2019	Laura Rita COVACIU (Pitariu)	Rethinking modern high school curriculum educational discourse: Moving towards a new model: The didactic discourse: classification and features -- curriculum ideologies	Prof Eric Gilder	“Lucian Blaga” University of Sibiu (Romania)
2019	Anca Simina- MARTIN	Shakespeare’s bawdy puns: Their (un)Translatability	Prof Eric Gilder	“Lucian Blaga” University of Sibiu (Romania)
2019	Ruxandra Mădălina POP (Dan-Pop)	A discursive-semantic model of attitudinal appraisal of sexuality in Romanian online personal advertisements	Prof Eric Gilder	“Lucian Blaga” University of Sibiu (Romania)
2019	Elena (Meştereagă) GORDEA	Bilingual education and social change	Prof Eric Gilder	“Lucian Blaga” University of Sibiu (Romania)

2019	Isabela DRAGOMIR	Representations of power dynamics In NATO military discourse	Prof Eric Gilder	“Lucian Blaga” University of Sibiu (Romania)
2019	Scott EASTMAN	Standardized methodology for implementing applied critical geopolitical discourse analysis to improve forecast accuracy	Prof Eric Gilder	“Lucian Blaga” University of Sibiu (Romania)

Internal

2019 CDS Department Postgraduate Supervision

Candidate	Program	Year	Supervisor(s)	Research Topic
Nermann KALOWA	MCS	1	Prof. Khan Dr Essacu	A communicative approach to moral issues in Kabwum Area: A case study of Selepet LLG in Kabwum District, Morobe Province.
Justina KUMASI	MCS	1	Ms Ambelye Dr Yaraepa	Investigating the challenges of communication process translation from English to Pidgin in rural developing areas: A case study of Zindiga community of the Bulolo District.

Lidis LEMOS	MCS	1	Dr Essacu A/Prof. Sali	Meaningful participation of Women in all Government Structures: A case study of Women in Obura Wonenara District, EHP.
Liksen MANDALI	MCS	1	Dr Yaraepa Ms Ambelye	Teachers' views on special education needs children entering Primary Schools: A case study of selected schools in PNG
Regine YAMASOMBI	MCS	1	Dr Aisoli- Orake Dr Yaraepa	Educational issues impacting female social and intellectual performances: A case study of Education system in Yangoru-Saussia District, ESP.
Jacob ZUA	MCS	1	Dr Yaraepa Ms Ambelye	The effectiveness of Developing English (L2) Competency using Four Communicative Approaches in the Standard-Based Curriculum: A case study of students in the remotest Primary Schools in Kabum District
Ngawae MITIO	MPhil	1	A/Prof. Sali Prof. Gilder	An investigation of challenges of sustainable development in Bulolo District: A case study of seven Biangai villages of the Wau Rural LLG of the Bulolo District

Shauna AISIME	MCS	2	Dr Aisoli- Orake Ms Ambelye	Dutch disease and the role of communication in addressing socioeconomic issues: A case study in Wapfi Mining Area
Alex KAMBAO	MCS	2	Prof. Gilder Dr Yaraepa	Participatory communication in the registration of unelinated land for community development: A case study of primary, community and elementary schools in Enga
John MILBA	MCS	2	Dr Essacu Prof. Khan	Effective communication approaches in improving Timber Authority (TA) and Forest Management Area (FMA) application process: A case study in Madang/Morobe Province
Christie PASKALIS	MCS	2	Dr Aisoli- Orake Ms Ambelye	Comparing and contrasting communication barriers and challenges in Kavieng LLG, New Ireland Province: A case study to identify and develop a sustainable approach to addressing issues at all levels of structure
Jack YARO	MCS	2	A/Prof. Sali Dr Essacu	Effective communication strategies in addressing occupational health and safety risk management in resource

				development industries in PNG: A case study of Barrick (Porgera) Gold Mining Ltd. Enga Province
Jacob NAWA	MCS	2	Dr Yaraepa A/Prof. Sali	Application of participatory communication as a model for delivering community water supply and sanitation in PNG
Kerryanne MESKERE	MCS	2	Dr Aisoli- Orake A/ Prof. Sali	Evaluating and Determining the Extent and Effects of Restoring Clan Relationships Subsequent to Land Ownership Conflicts as a strategy for Rural Community Development: A Case Study of Central-Inland Pomio Rural LLG, Pomio, ENB Province.
Mary AISI	PhD	1	Prof. Gilder Dr Aisoli- Orake	Effective Strategic Management: Catalyst for Organisational Efficiency and Accountability in Educational Institutions in Papua New Guinea
Elymas BAKUNG	PhD	3	Prof. Khan A/Prof. Sali	The Propagation of Socio-economic Restructure by Cult Doctrines and its Threats to the Future of the Existing Formal Socio-economic Structures in Morobe Province.

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Notes:

1. For MCS research students the principal supervisor is mostly responsible for the research outcome; the co-supervisor is available for student consultation.
2. For MPhil and PhD scholars both principal supervision and co-supervisor are responsible but the former directs the research project.

Post Graduate Certificate in Student Centered Teaching (PGCSCT) 2019

Taught at the TLMU Center under the direction of Prof Eric Gilder, the PGCSCT consisted of the following modules, taught to registered staff members at the University as an after-hours instructional offer:

CDS 511: Learning Management Systems and Flipped Classrooms (Dr. N. Talib)

CDS 512: Problem Based Teaching and Learning (Ms D. Kialo)

CDS 513: Trends in Higher Education Pedagogy (Dr T. Nuru)

For successful completion, all modules included Continuous Assessments (of 40% weight) which had to be passed (45 minimum mark) as well as a passing total mark (3 CAs + capstone project) of 50. Six students completed all requirements for the course:

BILLY, Bau

FONO, Tamo Romeo

SANGUDI, Adrian

SENIELA, James

SYED, Shoeb

COSSEY, Yossey

Undergraduate Final Year Research Supervision (CD 472)

STUDENTS, SUPERVISORS, RESEARCH TOPICS - 2019

	Surname	First Name	Sex	Supervisors	Research Topic
1	ANDALU	Nelson	M	Dr Sali	Communicating an Integrated Community-Based Approach to Building Peace and Order in the Four-Mile Area of Lae City in the Morobe Province.
2	ANGORI	Francisca	F	Professor Gilder	A Study into the Rising of Informal Settlements: A Case Study of Banana Block, Lae City, 2019.
3	BANUILO	Debrah	F	Dr Yaraepa	Challenges of Managing Large Families: A Case Study of Tiauru Oil Palm Block Holders in Bialla, West New Britain Province.
4	BINI	Samuel	M	Mr Wrondimi	Modernization and the Rising Marriage Problems in Lae, PNG.
5	GIRORO	Stewart	M	Dr Essacu	A Case Study of Gender Inequity Impact on Correctional Service Head Quarter Operational Unit Female Employess in Waigani National Capital District, PNG.
6	GULL	Willieanna	F	Dr Aisoli-Orake	Illegal Settlements and Crime in Lae City: A Comparative Analysis on Banana Block and Papuan Compound Settlements (2016 – 2018).
7	HENRY	Melanie	F	Mr Wrondimi	Economic Empowerment of Women and Girls in PNG: A Case Study of Sialum Compound, Lae Morobe Province.
8	IBITALI	James	M	Dr Aisoli-Orake	An Effective Communication Framework to Identify Difficulties Faced Between the Hides Transmissions Line (HTL) Landowners at Hiwanda Village of Hayapuga LLG and Barrick PJV in the Hela Province.
9	JANN	Mecky	F	Mr Wrondimi	Effective Communication Strategies for Addressing Special Mining Lease Renewal for the Next 20

					Years: A Case Study of Pogera Gold Mining in the Enga Province.
10	LAIMO	Betty	F	Mr Winuan	Impacts of Commercial Industries on the Residents in Residential Zoning Areas: A Case Study of Kamkumung Suburb in Lae, Morobe Province.
11	LAZARUS	Kimson	M	Mr Mitio	Impact of Informal Sector Activities in Vanimo: A Case Study on Street Vendors of Vanimo Urban Local Level Government.
12	LEMOS	Linny	M	Mrs Maino	Teaching HIV/AIDS Curriculum as an Active Separate Subject in Primary Schools: A Case Study of Grade Eight Students of Taraka Primary School, Lae, Morobe Province.
13	MAMBERE	Jonathan	M	Mr Kuri	Communicating Traditional Chieftaincy System into PNG Government System: A Case Study on the Guhusamne Tribe (Waria LLG) Can Be a Catalyst to Eradicate Haven of Corruption Through West Minister System.
14	MARAS	Shavina	F	Dr Yarapea	Impacts of Social Media Among Youths on Behaviour Change: A Case Study of First Year University Students at Unitech.
15	MARK	David	M	Mr Sefo	Applying Effective Communication Strategy to Prevent the Increase of Criminal Activities and Crimes in Taraka Community in Lae, Morobe Province.
16	MATAPIA	Venasius	M	Dr Sali	Underserved Rural Communities in PNG. A Case Study of Viosopuna Ward in Pomio District of East New Britain Province.
17	MURIKI	Faustina	F	Mr Sangundi	Teaching of Tok-Pisin in Elementary Schools and Its Impacts on the Academic Performance of Grade Three Students in PNG: A Case Study of Taraka Primary School in Lae Province in 2018.
18	NEKI	Hendrix	M	Professor Gilder	Impacts of Child Labour in PNG: A Case Study of Working Street

					Children in Eriku, Town and Main Market of Lae City, Morobe Province in 2019.
19	NELSON	Rachael	F	Dr Yaraepa	Participatory Communication Perspective to Address Water and Sanitation Problem: A Case Study of Madang Block in Lae, Morobe Province.
20	PAINAKAL	Jeff	M	Mr Sefo	Malaria in Awagsi Village
21	PAUL	Albert	M	Dr Essacu	Causes and Consequences of Rural-Urban Migration: The Case Study of Mendi Town, Southern Highlands Province, PNG.
22	RENNIE	Erica	F	Dr Aisoli-Orake	Depriving Children's Rights for an Education: A Case Study of Vunabalbal Ward of ENBP in 2019.
23	SAWA	Tanya	F	Ms Ambelye	The Causes of the Increase in Petty Crimes in Lae City: An Analysis of the Petty Crime Hotspots, Main Market and Top Town.
24	SOLOMON	Noel	M	Mr Winuan	Youth Unemployment: A Study of How Mobile Phone Usage Affects Urban Youth Employment in Morobe Province.
25	SOMBO	Sandie	F	Mr Mitio	Understanding the Causes and Effects of Tuberculosis towards Human Development: A Case Study of Bumayng Community, Lae, Morobe Province.
26	STOESSEL	Delilah	F	Mrs Maino	Informal Land Markets in Lae, PNG between 2015 – 2018: A Case Study of Kamkumung.
27	TOYEN	Francisca	F	Mr Kuri	Child Negligence and Its Implications on the Socio-economics of PNG: A Case Study of Child Negligence in the Eriku Suburb (Lae, Morobe Province) in 2019.
28	WII	Lucy	F	Mr Sangundi	Miscommunication of Information Prevents Development in Urban Settlements of Lae City: A Case Study of East Taraka Settlement.
29	WILKENSON	Fredah	F	Ms Gwale	The Effects of Excessive Water Flow into a Village Community: A

					Case Study of Nasuapum Village, Lae, Morobe province.
20	ZEBEDEE	Brandon	M	Professor Gilder	The Effect of Inadequate Adult Education on Illiterate Adults Living in Uni-Settlement in Morobe Province in 2018-2019.

DEPARTMENT OF ELECTRICAL AND COMMUNICATION ENGINEERING

A/Head of Department: Dr. Joseph Fisher

Introduction

Electrical Engineering is a science-oriented field that is concerned with many disciplines such as power systems engineering, electronics and communications engineering, electromagnetics, control systems engineering, and computer engineering. Further, it encompasses many other sub-disciplines such as electric machines, power electronics, antenna and propagations, instrumentation and process control, mechatronics and robotics, industrial electronics and automations, biomedical engineering, consumer electronics, sensors and measurements, and computer networking. In fact, almost all technologies in modern life from nano and micro scale devices to small-scale devices, and the large scale systems rely on electrical engineering. In the nano/micro scale, technologies such as pacemakers, implantable cardioverter-defibrillators, and many other implantable devices can scavenge energy from everyday actions (motion), ambient radiations (thermal), or even from the vivo-fuel cells that oxidize blood glucose to provide a small trickle of energy. The small-scale systems, such as mobile phones rely on battery storage for power supplies, whereas the large scale systems such as aircraft, ships, and power systems are driven by large electric machines.

At the Papua New Guinea University of Technology, the Department of Electrical and Communications Engineering offers degree programs in Electrical Engineering at both Undergraduate and Post Graduate levels.

The undergraduate program leads to the Degree of Bachelor of Engineering in Electrical with minors in Power and Communications Engineering. The offered postgraduate degrees are currently research based, leading to Master of Philosophy (MPhil) and Doctor of Philosophy (PhD) degrees in both Power and Communications streams.

The degree of bachelor of engineering in Electrical Engineering Communications minor covers courses in Communications Engineering aimed at deepening the knowledge and skills of

students on the basic concepts and theories that will equip them in their professional work involving analysis, systems implementation, operation, production, and maintenance of the various technologies such as computer network, the cellular services that includes the Global System for Mobile (GSM) communications, Code Division Multiple Access (CDMA) protocols used in 2G and 3G wireless communication, and the Long Term Evolution (LTE). The LTE is a high speed wireless communications technology that many modern cell phones and cellular devices use as in 4G and 5G. Further, the students also broaden their knowledge in other technologies such as the radar and sonar which are detection systems that use radio waves to determine the range, angle, or velocity of objects in air or water respectively. Radar systems can be used to detect aircraft, ships, spacecraft, guided missiles, motor vehicles, weather formations, and terrain. The students also study computer networking and intelligent electronics devices that drive the Internet of Things (IoT). IoT is simply a network of devices such as vehicles, and home appliances that contain electronics, software, sensors, actuators, and connectivity which allows these things to connect, interact, and exchange data.

Similarly, the degree of bachelor of engineering in Electrical Engineering Power minor covers courses in Power Engineering which entails topics on efficient and sustainable power generation, transmission and distribution which are highly important for reliable energy network. Studying the Power Engineering minor allows students to investigate power distribution and usage through electrical devices such as generators, transformers and switch gears. The current trend in the design and utilisation of modern distribution networks includes diverse generating sources including renewable energy (RE) sources directly connected to the distribution feeders as distributed energy resources (DERs) to form microgrids. With the use of communication technology to improve efficiency and robustness, the microgrids have been transformed to smart grids. The shift in traditional power systems grids to integrate renewable distributed generations has significant potential to reduce carbon dioxide emissions and provide secure and resilient power supply. The development of smart grid systems which allows for two-way communications between the electric utility and its customers, and the sensing along the transmission lines makes the grid more efficient, more robust, and more resilient to disruptions.

Further, power engineers perform any of the following tasks: operate automated or computerized control systems, stationary engines and auxiliary equipment such as reactors, boilers, turbines, generators, pumps, compressors, pollution control devices and other

equipment to generate electrical power and to provide light, heat, ventilation and refrigeration for buildings, industrial plants and other work sites. Power engineers are in charge of very large systems whose availability and reliability are critical to the society's ability to function and develop. The increase in demand in power, environmental and economic constraints, and the scarcity of some sources of energy (such as fossil fuels) pose significant challenges to modern power engineers. Thus, the issue of energy and environmental sustainability is a mammoth task that transcends the use of clean and reliable energy. It involves many engineering challenges in light of the climate change and its effects on the environment. Power engineers continue to face these mounting challenges to provide sustainable and smart energy solutions.

The Papua New Guinea University of Technology is the only university in Oceania apart from the universities in Australia, New Zealand, and Hawaii (a State of USA) that specializes in Engineering and Technology, its research plan is focused in producing undergraduate and postgraduate students that are competent to be top class engineers and leaders. The graduate engineers should be able to position themselves as advisors and wealth generators for the country and the region. Moreover, recognizing the importance of both research and research-intensive universities to the development of knowledge economies, it is pertinent that the University should generate new knowledge and new technology that are relevant to the national needs. This will alleviate dependence on hiring expertise from abroad thus, enabling national engineers and researchers the needed technical and research expertise to attract foreign industries to invest in Papua New Guinea and produce a local job market that is of economic benefit to the nation.

The degree in Bachelor of Engineering in Electrical Engineering is a four year program with specialization in Communications and Power Engineering. The students covers mathematics and physics in addition to the core curriculum in either power engineering or communications engineering and other required electives. In the final year of the studies, students undertake research projects on various topics in Electrical Engineering. The students show their ingenuity and innovation in researching on various topics and building prototypes or undertaking simulation models and presenting their work at the end of the academic year. The research projects are designed to trigger engineering curiosity of students and finding new methodologies to foster innovative design that employ the synergistic effect between design and innovation as the key in promoting engineering

ingenuity. Table 1 provides a listing of a number of research topics undertaken within the Department in 2019.

The Department of Electrical and Communications Engineering also offers postgraduate research degree leading to the degree of Master of Philosophy (MPhil) and Doctor of Philosophy (PhD). Currently, the ECE department has a total of 10 research students, 4 PhD and 6 MPhil. One of the priorities of the PG research program is to locally train national academic staff.

Table 1 Undergraduate Students' Research Projects

No	Project Supervisor	Undergraduate Research Project Title
1	Dr. Moses Kavi	Solar Powered PLC Based Traffic Light System for Lae City Roads
2		PV Based DC Power System Design, Load Modelling and Protection for ECE Building
3		Performance Evaluation of Variable Speed Motor Drives With and Without Harmonics Filters at Newcrest Mine
4		Power System Protective Relay, Modelling and Performance Evaluation
5	Dr. Joseph Fisher	Small Scale and Community Based Renewable Energy Power Supplies for Rural PNG
6		Load Flow Studies
7		Electrifying Hela Province using Hydrocarbon and Other Renewable Energy Sources
8		Fixation, Testing and Installation of Electric Machinery
9	Mr. Gibson Kupale	Designing and Upgrading of Gatop Mini Hydro Power System from 75kW to 150kW
10		Rural Electrification: Lipenom to Piambil Distribution Line Design
11		Proposing Non-Technical Loss Detection Methods and Proposing Remedies Applicable to PNG
12	Mr. Herman Kunsei	Performance Evaluation of Unitech WLAN
13		Design and Implement an Online Repository System Using Moodle for DODL
14	Mr. Sammy Aiau	Solar and Wind Power Systems for Sumkar District – Feasibility Study and Design
15		Micro-Hydro Power System for a Kainantu Village in Eastern Highlands Province
16		Photovoltaic Solar Back-up Power System for Goroka
17		Markharm Valley Solar and Wind Power System Mapping and Design
18	Mr. David Chen	3D Printed Programmable Robot Arm using STM32
19	Ms. Rani Maeaoka	Filter Design for a Commercial 12VDC/240VAC Inverter
20		Power Quality And Its Effect on PNG Unitech Power Bill
21	Mr. James Dugumari	GPS Mapping and Tracking
22		Unix-Based Portable TV Broadcast System
23		Student Assessment and Report Card Production System

Electrical Engineering Department projects that about 70% of the full academic carder will be filled with national members of staff, of which a minimum of 80 % will have PhD degree

and the rest with competitive expatriate members of staff expert in one of the ten specializations and able to work together giving significant research leadership in the global scenario.

The Department's basic commitments, in keeping with these priorities are:

1. A department that is fully integrated with Papua New Guinea industry and community, changing society and creating wealth.
2. Depth of quality and multidisciplinary in learning and applications through classroom, laboratory and research programs which have measurable outcomes.
3. Research and Innovation work that is beneficial to the local community and contributes to knowledge and experience to international challenges in science and technology and their functions in society.

Vision

To be at the cutting edge in teaching and research in the generation and application of electrical engineering knowledge in graduating globally competent professional electrical engineers of high ethics and human values.

Academic Priorities and Basic Commitments

The major academic priorities and university's commitment to training nationally academic staff through PG research degree programs aims to;

1. Integrate Research with Teaching and Learning
2. Connecting the academics with the community for its service
3. Make the teaching and learning process compatible with industry
4. Recruitment of the best talents nationally and internationally and retaining them.

Description of Research Work:

A list of current research students with description of the research topics are given herein. Table 2 gives a list of current research students with their research topics and followed with summarized description of each research topic.

1. Space Technology Based Smart Grid System Evaluation for PNG: Focusing on Markham District New Township Solar- wind Renewable Energy Supply

A portable weather station with an inbuilt data logger and a modem was installed on an 8 meter constructed tower at the Umi solar and wind site at the end of August 2016. Please note that the portable weather station has the capability of remote monitoring and transfer of data

from the site to a computer in an office however the set will require a web base IP address which requires a use of internet domain name set up. Hence currently travelling every two weeks, to and from the research station site at Umi, Markham District and manually downloading the data on a flash drive.

Table 2 Current Postgraduate Research within the Department

No	Research Student		Research Topic
1	Mr. Sammy Aiau	PhD	Renewable Energy Sources for Morobe Province and Future National Smart Grid for PNG
2	Mr. Gibson Kupale	PhD	Centralized and Distributed Micro Grid and Grid Extension in PNG
3	Mr. Herman Kunsei	PhD	Array antennas and signal processing for Underground Mine Telecommunication Systems
4	Mr. David Chen	PhD	Application of Drones for Sustainable Agriculture in PNG
5	Mr. Sylvester Tirones	MPhil	Smart Battery Management System
6	Mr. Mathew Pua	MPhil	Dynamic Load Frequency Control of Micro-grids with Diverse Distributed Energy Resources
7	Ms. Serah Mako	MPhil	Analysis of Signal Strength and Bandwidth for Enhancement of Quality of Services within the Papua New Guinea University of Technology
8	Mr. Charlie Urame	MPhil	Design and Implementation of Hybrid Pico-Hydro Power Plant in Massy-Gahuku LLG
9	Ms. Jacqueline Tentapua	MPhil	The Effects of Out-of-Band-Emission on Network Performance in the Prime Base Transceiver Sites of Lae's Central Business District
10	Mr. Isaiah Koldai	MPhil	Design of Renewable Energy Based Micro-Grid for Rural Electrification: A case for Salamua LLG.

During the 2017 study program the portable weather station set up at Umi, Markham District in the Morobe Province was logging in the ground-based measurements of solar irradiances and wind speeds and wind directions. The portable weather station has been logging in the solar irradiance, wind speeds and directions starting September 2016 and throughout the 2017 study program these data have been downloaded onto a flash twice every month to the end of 2017 and will continue into year 2018. These data will be analysed and compared with the GIS data (completed in 2016 with the assistance of Dr. Sailesh Samanta, Head of GIS section, Department of Surveying and Lands Studies, PNG University of Technology) and simulate the solar and wind power generation at the Umi site for the new Umi Township for the Markham District.

For the 2017 study program the following were carried out

- Ground-based measurements (data logger) of solar irradiances and wind speeds at the Umi weather station research site (continuing into 2018).
- Analysis of the ground-based measurements of solar irradiances and wind speeds for the Umi site.
- Developed solar and wind models and started simulations using the Matlab/Simulink and ETAP (Electrical Transient Analysis Program) simulation software packages.
- The simulations will be basically on the power flow or load flow analysis on the various models of distributed power systems. In the simulations I am limited to 25 bus power systems, while the Ramu grid has over 80 buses.

2. Centralized and Distributed Micro Grid and Grid Extension in PNG

In PNG generation reliability has significantly improved after the government moved to have Third Party Access (TPA) passed for the generation market for electricity generation. This led to private service providers investing in the generation of electricity in PNG, boosting generation reliability. However, the large electric transmission and distribution grids remain an important issue with regard to overall system reliability, thus pushing down the Performance Index (PI) of the electric power system in PNG. Electric Power Grid Security analysis and Reliability computations are essential for the good design, operation and extension of any power grid, including the PNG grids, currently operating as separate islands. The research reported herein is believed to be ground breaking in that it takes up the critical challenge to look at the PNG grids from the perspective of Security and Reliability. How reliable and secure a Power System Network is, can be determined by different techniques. Due to the dynamic nature of the system, making reliability one hundred percent for big network will continue to remain a myth. However, contingency analysis of each transmission line branch and generation machines by way of DC load flow and determining the Line Outage Distribution Factors (LODF) and Generation Shift Sensitivity Factors (GSSF) provides a quick way of system behavior after each contingency. The initial results in determining LODF, GSSF and PI will be presented. The work is done with help from the national electricity authority.

3. Array Antennas and Signal processing for Underground

Mine Telecommunication Systems

It is recognized that wireless communications in the underground mines will have advantages over the wired (e.g. using leaky wave cables) telecommunication systems currently used in underground mines including for the location and communication with miners trapped by tunnel collapse or explosions.

However, the underground mine presents a formidably harsh environment for space waves radiated by antennas. In this work a new design for array antennas is sought, with appropriate measurements of underground signal propagation measurements done to design against interference due to multiple reflections from the cave surfaces as well tunnel bends and junctions. Initial work has made progress in the design of an array antenna that is simple in structure but will generate a single beam with significant reduction in additional beams which lead to waste of battery power as well as multipath signals emanating from the unwanted side lobes. This will also cut down on the need for reflectors which are commonly used in above ground wireless telecommunication systems.

4. Application of Drones for Sustainable Agriculture in PNG

At the time of writing, the use of drones in science and engineering research is becoming more popular, spanning from the area of defense, emergency response, wildlife conservation to disease control, health care, and agriculture. The popularity of drones stems from its agility to navigate into spaces that are difficult to reach by other means. Although the cost of drones may vary between 1,000 USD (DJI's Phantom 3) and 25,000 USD (sense Fly's and Bee RTK) . Besides the high price tag, the biggest roadblock to attracting the further interest of their use is the lack the flexibility for full customization of the product due to its proprietary nature. This paper hopes to expose the truth, and that is, drones are not only easy to build but also very customizable. We will prove this by constructing a quadcopter using the most straightforward open-source software, low-cost electronic components, affordable rechargeable batteries, affordable brushless motors, and 3D printed parts made using inexpensive FDM 3D printers. Also, we try to keep this process as simple as possible by having the flight controller built using only an Arduino Uno board and an MPU6050 gyroscope sensor. The scope of this presentation covers only the implementation of flight stabilization and navigation aspects of the drone. However, the advantage of being a simple platform is it provides a much low barrier of entry and finer grain of control on the aspect of construction cost and the technicalities of incorporating other functionalities more targeted

towards particular areas of research.

5. Smart Battery Management System

The need for electricity is known as the source of energy, which the accessibility is of importance to everyone both living in remote and urban center of Papua New Guinea. Most urban center especially towns and cities have access to some form of electricity, especially hydro-electricity, whereas our concerned is driven towards the least fortunate people who are currently living in remote areas of PNG such as small scale stations and villages which have no access to a few form of electricity. To meet 2050 vision of PNG, it is true that each and every household within a remote part of our beautiful nation should have access to electricity in some formation or it could be of smaller quantity. Mitigating poverty for sustainable development and engineering design can be a solution which could greatly eradicate the struggles of having access to electrical energy which could participate in work done. The most important uses of electricity in such remote environment would be basically aligned within the scope of household, schools, church, and aid post etc. The demand may include the following few key needs such as lighting, charging of mobility devices like smart phones and laptops, uses of printers in school and home appliances: The design of Advance BMS involves the use of microcontroller which acts as a platform for reading signal from variety of sensors and setting conditions for real-time signal processing and management of the systems. The BMS will integrate the control for Photovoltaic (PV) system to reliably capture more light as possible to maximize the output efficiency by tracking the sunlight. Human to BMS interaction using Global System for Mobile Communication (GSM) enables friendly and reliable data transfer for further assessment of the system's functionality. The Advance BMS would be PNG's remote electricity sustainable development for the future.

6. Dynamic Load Frequency Control of Micro-grids with Diverse Distributed Energy Resources

The stability in the power system is very important in PNG as country is experiencing an economic boom. In this country we are using traditional method of supply the electricity which is the Hydro-Electric power generation. But the generation capacity is too small compared with the growing demand of electricity. As a result frequent blackouts are continuously experienced in all parts of the country. In line with 2050 Millennium Development Goal (MDG), the current Government has pledge a support to provide a reliable power source with the aim of 70% to 80% household in Papua New Guinea to access

electricity. In order to achieve that goal, Diverse Distributed Energy generation method can be introduced in the Power system. The greatest challenge with this system is how to do Load Frequency Control (LFC). The stability in power system is obtained through controlling the frequency proportional to change in load. With the traditional system, governor system is used to adjust the frequency but with the interconnected system it is very challenging to do LFC. This is because non-renewable sources like solar, does not have the rotating part to supply the inertia to the system to keep the system stability. However, different controllers have been developed to control the frequency in the interconnected system to give the stability during sudden change in load. In my study I have chosen demand response (DR) method to analyse the LFC which is very important since this system is only way forward to achieve 2050 Vision and to provide reliable and stable power system in the country.

7. Analysis of Signal Strength and Bandwidth for Enhancement of Quality of Services within the Papua New Guinea University of Technology

Mobile Communication is one of the emerging technologies in last decade around the globe and highly demanded technology in Papua New Guinea (PNG). Even though, the development of the mobile technology was recently introduced in the country. Due to geographical distribution and increasing number of users posted many design and implementation issues. The Quality of Service is one of the major concerns while implementing mobile communication in PNG because of business revolution in country which leads to increased number of users. The Information and Communication Technology (ICT) is one of the major focus areas for government of PNG. The government organization, National Information and Communication Technology authority (NICTA) regulates the availabilities of mobile service providers, to assess and sets rules for the country's limited frequency spectrum availabilities of improving the Quality of Service. This research work focused on analysis of quality of service including service downtime and spectrum control of the various mobile service providers in the region. The geographical location to carry out the experiment and analysis of QoS is The Papua New Guinea of Technology (UNITECH), Lae, Papua New Guinea. The UNITECH has various transmitters or based station of the service provider such as Bmobile, Telikom and Digicel. The purpose is to access the transmitted spectrum power of each major service providers within the strict active bandwidth and guard bandwidth allocated to each of them. The frequency spectrum

allocated to each are mentioned with respect to the downlink and the uplink. Using the particulars within the UNITECH premises, the character of the transmissions over the day. These are plotted with respect to the users' habits and movement. Later, this research work proposed the new design layout for the service providers to enhance the QoS. The preferred network type considered for this research work is 3G and the latest WCDMA 3G – 4G

8. Design and Implementation of Hybrid Pico-Hydro Power Plant in Massy-Gahuku LLG

Hydroelectricity is an environmentally friendly renewable source of energy that utilizes the potential energy from dammed water to generate electricity. Fillings creek in Massy Village in Gahuku LLG in Eastern Highlands Province of Papua New Guinea has a flow rate of 150 l/s. In this paper is reported a new design, implementation and result of a new Hybrid model of a pico-hydro plant prototype. The hydro head of the Pico-Hydro plan to be commissioned was 5m which accumulated a hydraulic potency of the stream of about 7.350kW. This raw power will be rectified with a 6A full bridge rectifier and used in conjunction with 12V 400AH deep cycle battery bank system to supply power to a newly furnished double story house. The Generator output is coupled with 12V 15A PV solar panels connected in series that is connected to a MPPT charge controller for optimal charge efficiency. The turbine consists of a modified crossflow turbine that is coupled with a gearbox to amplify the rpm of the system. This gearbox is coupled with the shaft of a synchronous generator to roughly 450W max power. A Programmable Logic Controller (PLC) with one of its relays connected to a 12V heating elements connects the charge controller and the battery bank. The PLC activates the hot water heating element when the battery bank is fully charged. The Arduino GSM module monitors the entire process and automatically sends notification via a SIM interface to the system administrator notifying the system administrator of the on/off state of the heating element.

9. The Effects of Out-of-Band-Emission on Network Performance in the Prime Base Transceiver Sites of Lae's Central Business District

Interference analysis being a fundamental procedure to monitor the spectrums environment- especially an environment heavily used by different sources and organizations. This paper investigates the out-of-band (OoB) emissions and associated suspected interference in the wireless systems of the three (MNOs). OoB emissions can severely degrade the network performance and cause network disruption. Initial investigation indicates the presence of

out-of-band emissions in Lae central business district (CBD). Further off-air spectrum measurements will be performed to collect data in Lae CBD. The collected data will be analyzed to determine the exact effects experienced by users where a good number of these MNOS are located. The data collected will be used to investigate if the deployment of 3GPP application of frequency refarming on the same band or if emissions are related to increased subscriber activity during peak hours and if the emissions are intermodulation interference that degrades network performance. The results will assist system operators to make corrective measures to ensure that OoB emission is reduced and the network performance is maintained to provide top quality of service with improved reliability and availability. The scope of the study is limited to the GSM band (Band IV) of the PNG Spectrum Map, considering both the uplink and the downlink. The investigation will report if these emissions are interferences due to: a) the deployment of this 3GPP application of Frequency re-Farming, with having both GSM and WCDMA on the same band. b) If emissions are related to increased subscriber activity during the peak hour times of the day due to initial poor network planning and under-dimensioning, leading to network congestions and degradation of Quality of Service (QoS). c) To determine if the emissions are intermodulation IM interference as a direct result of non-linearities caused by prolonged wear and tear of hardware giving way to loose ends. The focus of this study will be mainly in the GSM band (Band IV) of the PNG Spectrum Map, both in the Uplink and the Downlink of this spectrum band. The study will be focused on the problems in relation to Spectrum Allocation and Interference mitigation, where the poor quality of a network directly impacts on the service offered to the subscriber affecting his communication and ability to conduct business.

Publications in 2019

Conference Papers

1. Aiau, S., PRP Hoole, J. Fisher & M. Kavi (2019). Renewable Energy Resources Mapping in Papua New Guinea: Solar and Wind Power, Case Study in Markham Valley, Morobe Province, Papua New Guinea. 29th IEEE Australasia University Power Engineering Conference (AUPEC), Fiji, 26th-29th November.
2. Fisher, J., P.R.P. Hoole, K. Pirapaharan, & S. R. Hoole (2019). Assessment of Electrostatic Discharge Threats To Digital Power Substation and Aircraft Apparatus and Electronics. Australasian Universities Power Engineering Conference (AUPEC 2019), Fiji, 26th-29th November.

3. Kavi, Moses, Yateendra Mishra, Yang Li, & Mahinda Vilathgamuwa (2019). Detection of DC Arc-Faults in Battery Energy Storage Systems. IEEE 13th International Conference on Power Electronics and Drive Systems (PEDS 2019), 9th – 12th July, Toulouse, France
4. Singh, Amritpal, Aditya Khamparia, & Ashish kr. Luhach (2019). Performance Comparison of Apache Hadoop and Apache Spark. Second International Conference on Advanced Informatics for Computing Research (ICAICR 2019), held in Shimla, H.P., India, 15-16 June.
5. Singkang, Lorothy Morrison Buah, Kismet Anak Hong Ping, & P.R.P. Hoole (2019). Electric Discharges Localization for Substation Fault Monitoring Using Two Elements Sensor. ASIA International Multidisciplinary Conference

Journal Papers

1. Bhattacharyya, Sumanta, Manoj K. Mukul, Ashish kr. Luhach, & Joel J.P.C Rodrigues (2019). Motor Imagery based Neuro-feedback System using Neuronal Excitation of the Active Synapses. *Annals of Telecommunications*, Springer 2019. Available at <https://doi.org/10.1007/s12243-019-00740-8>
2. Chung, Heewon, Jeong Changwon, Ashish Kr. Luhach, Yunyoung Nam, & Jinseok Lee (2019). Remote Pulmonary Function Test Monitoring in Cloud Platform via Smartphone Built-in Microphone. *Evolutionary Bioinformatics*, Volume 15, Sage Publication, Available at <https://journals.sagepub.com/doi/full/10.1177/1176934319888904>
3. Khamparia, Aditya, Aman Singh, Ashish Kr Luhach, Babita Pandey, & Devendra K. Pandey (2019). Classification and Identification of Primitive Kharif Crops using Supervised Deep Convolutional Networks. *Sustainable Computing, Informatics and Systems*, (In press and available at <https://doi.org/10.1016/j.suscom.2019.07.003>)
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DEPARTMENT OF FORESTRY

Head of Department: Dr Mex Paki

The Department of Forestry at Unitech is the only institution in the South Pacific region that offers training in tropical forestry at professional level. The Department has integrated Degree and Diploma curricula offered at Unitech and Bulolo campuses respectively. The *three- year* course leading to Diploma in Forestry is completed at Bulolo while the *four-year* course leading to Bachelor of Science Degree in Forestry is completed at Taraka campus.

The Mission Statement of the Department is: *Recognizing the capacity of forests to generate large number of jobs for a given level of investment, the Forestry Department at Unitech was established to produce professionals, both men and women, with technical production skills and expertise needed to manage PNG's forest resources sustainably. A well-managed forest is an asset to local and national economies and the well-being of current and future generations.*

Education is the university's principal mission and the Forestry Department aims to provide high quality academic and administrative support services not only for undergraduates, but with increasing focus on the training of postgraduate students. Our postgraduate program continues and further develops research skills they began learning through Year 3 courses (especially 'Experimental Design'), and culminating in Year 4 (final year research project).

Our overall educational challenge in forestry is to produce professionals, both men and women, with the necessary technical skills. Foremost amongst these is the ability to solve problems. It is to develop this problem-solving capacity that our department's research activities fundamentally fit into our education mission. To achieve this goal requires that the faculty themselves are not only well versed in research but apply that knowledge through active research projects and programs.

In the 2019 Forestry Department Research Report, there are two highlights of the Department's activities which we would like to recognize and promote. First is the Department's Five-Year Strategic Plan. This Plan is our first departmental articulation of the strategies and mechanisms by which we hope to enhance our department's research activity component. The Plan also

points out current, significant constraints in attaining our objectives that must be overcome at the university level. Second is our Department's recognition of the University's overall Vision "*To Grow World Class Technocrats for the Real World by 2024 and Beyond*" in line with the implementation of the University's Strategic Plan 2020-2024. The Forestry Department will continue to implement its academic and research activities at Departmental level thereby contributing to the University's overall Strategic Plan in 2020 and beyond.

FOREST/FORESTRY RESEARCH THEMES

The Forestry Department has long recognized the multi-faceted value of Papua New Guinea's forests, and over the years has woven this into its academic and research program. Sustainable forestry in PNG requires a cross-disciplinary approach, which today means blending aspects of the economy, social features, environment services and climate change.

The Department structures its Research Development Plan and Post Graduate Study Program around a number of specific research themes:

- ✓ Ecosystem and Environmental Services
- ✓ Forest Biology, Ecology & Biodiversity
- ✓ Forest (health) Protection
- ✓ Wildlife Management, Community-Driven Forest Conservation.
- ✓ Role of Forests In Climate Change
- ✓ Silviculture, Including Reforestation and Plantation Management
- ✓ Agro-forestry/ Social and Community Forestry and Multiple land-use
- ✓ Wood Science and Technology; Timber Production/Utilisation
- ✓ Forest Engineering
- ✓ Forest Policy ,Economics and Forest Product Marketing
- ✓ Appropriate Technology
- ✓ Remote Sensing and GIS
- ✓ Biomass Energy

SUMMARY OF FACULTY MEMBERS 2019

In the academic year 2019, Forestry Department had a total of 22 Academic Staff (Table 1).

Table 1: Academic Staff at Forestry Department (Taraka Campus and BUC)

Name	Position	Research Interest
Dr. Mex Peki	HOD & Senior Lecturer	Forest inventory including measurements and estimation of timber volume, biomass and carbon in plants (above ground). Sustainable Forest Management and Planning
Dr. Osia Gideon	Professor	Present interests in research are broad, but can be grouped into the following broad areas: Plant systematics (specialist in the families Rubiaceae, Costaceae, Zingiberaceae, Portulacaceae & Begoniaceae); Plant diversity and Conservation; Reproductive ecology of PNG Plants; New Guinea Biogeography; History of New Guinea Botany (exploration and biographies of botanists); Sustainable use of biodiversity (traditional and contemporary uses); Forest Policy for responsible sustainable development.
Dr. Mohammed Jashimuddin	Professor	Wood Science and Technology; Climate Change; Land use Change and Classification; Forestry and Livelihoods; Co-management of Forest; Forest and Environmental Economics; and Ecosystem Services.
Dr. Cossey Yosi	Senior Lecturer	Dynamics of Tropical Forests; Management of Natural Forests; Forest Law and Legality; Silviculture of Natural forest; Forest sampling; Payment for Forest Ecosystem Services; Climate Change and REDD+; Forest certification; Environmental impact studies
Mr. Peter Edwin	Lecturer 2	Wood science and technology; Forest management (Currently on PhD study leave at University of Melbourne)
Mr. Rapo Pokon	Lecturer 2	Plant biology, pest and disease
Mr. Haron Jeremiah	DHOD & Lecturer 1	Forest Economics and marketing
Mr. Diaiti Zure	Lecturer 1	Natural forest Silviculture; Forest Genetics; Soil-plant-microbial interactions and nutrient dynamics under changing

		environmental conditions; Ecological and molecular responses of plants and trees (crops) to climate change; and Evolution, phylogenetic and diversity of secondary medicinal plant metabolites (Currently on PhD study leave in Taiwan)
Mr. Leonard Wana	Lecturer 1	Forest Inventory & GIS
Mrs. Maureen Nuru	Part-time Lecturer	Animal Biology
Mr. Billy Bau	Principal Technical Officer	Plant Botany; Herbarium Curation; Plant Taxonomy; Botanical Collection; and Ecological and Biodiversity studies.
Mr. Eko Maiguo ¹	Principal Bulolo University College & Lecturer 2	Silviculture and Forest Management
Mr. Louis Veisami ¹	Technical Instructor 2	Forest Mensuration and Inventory
Mr. Benson Gusamo ¹	Lecturer 2	Wood Science & Technology, Forest Products, Non-timber Forest Products, Bio-energy
Mr. Bazakie Baput ¹	Lecturer 1	Community Forestry, Agro forestry and Forest Ecology
Mr. Olo Gebia ¹	Lecturer 1	Forest ecology and plant biology; Forest biodiversity
Mr. Tombo Warra ¹	Technical Instructor 1	Plant Eco-physiology and Conservation Ecology
Mr. John Beko ¹	Technical Instructor 1	Silviculture and Plant Propagation
Miss Pricilla Menin ¹	Technical Instructor 1	Community Forestry, Communities response on forest plantation and projects
Mr. Leonard Hansutan ¹	Technical Instructor 1	Phytoremediation - plant/soil and toxic chemical relationship
Mr. Samson Aguadi ¹	Technical Officer 1	Forest Enumeration through Imagery, Forest App Development and Forest Harvesting Operation Planning.
Mr. Koniel Alis ¹	Technical Officer 1	Bio-energy and Sawmilling

Note: ¹ Faculty members based at Bulolo University College (BUC)

ON-GOING RESEARCH PROGRAMS IN THE DEPARTMENT - 2019

The Forestry Department has a number of on-going research activities, which are segregated according to general theme and briefly described in Table 2, noting the principal investigators involved.

The details of the on-going research programs in the Department include the general theme of the research study; research project or topic; name of the principal investigator and the research status in 2019 (Table 2).

The 2019 status is basically to indicate whether the particular research activity was active as at 2019 or an on-going research study. On-going research studies are particularly those that are being undertaken on a long-term basis, most of which are collaborative research projects and are being funded by external agencies.

Table 2: On-Going Research Programs in the Forestry Department - 2019

GENERAL THEME	RESEARCH PROJECT / TOPICS	PRINCIPAL INVESTIGATOR	2019 STATUS
1. Ecosystem and Environmental Services	<p>1. Payment for Forest Ecosystem Services (PFES) in a community forest in PNG: A case study in Sogeram, Madang Province.</p> <p>2. Estimating CO₂ sequestration from permanent sample plots: an investigation to inform the potential of payment for environmental services (PES) for Papua New Guinea communities.</p>	<p>H. Scheyvens C. Yosi M. Winai S. Serawe C. Yosi</p>	<p>Completed in 2019</p> <p>Manuscript completed for publication in 2019</p>
2. Forest Biology, Ecology & Biodiversity	<p>1. A review of genus <i>Ixora</i> in Papuasias region with an exploration of sources of species richness including flower-dependent niche partitioning.</p> <p>2. Using distribution of Geometridae moths to understand the changes in forest along the latitudinal gradient in PNG.</p> <p>3. Exploring root causes of <i>Piper aduncum</i> competitive ability with an investigation of possible mitigative control measures in the Bulolo <i>Araucaria</i> plantations, Morobe Province, PNG.</p> <p>4. Patterns of Fern Species Richness and Beta Diversity in Highlands Ecosystems of PNG.</p> <p>5. New Guinea species of <i>Ficus</i> in section <i>Malvanthera</i> (Moraceae)</p>	<p>Heveakore & O. Gideon</p> <p>J. Paliu & R. Pokon</p> <p>C. Single & L. Orsak</p> <p>G. Sosanika & O. Gideon</p> <p>B. Bau</p>	<p>Completed</p> <p>Not Known</p> <p>Not Known</p> <p>Not Known</p> <p>Manuscript completed in 2019, awaiting publication</p>

	6. Floristic inventory of the Forestry Department Arboretum at the PNG University of Technology	B. Bau	Work still in progress
3. Forest (health) Protection	1. Fruit fly community observation and assessment in PNG forests for forest health analysis. 2. The Importance of latex as a defense against folivorous insects in a tropical rainforest.	R. Opasa & R. Pokon G. Luke & O. Gideon	Not Known Not Known
4. Wildlife Management, Community-Driven Forest Conservation	The Role of Indigenous Knowledge in Forest Management: Implication for the Multi-purpose National Forest Inventory in PNG.	C. Bigol & M. Peki	Resubmitted in 2019
5. Role of Forests In Climate Change and Carbon Trade	1. Modeling of Forest Soil Carbon on Primary Forest Types in Morobe Province using Terrain Attributes.	L. Moripi & M. Peki	Submitted to examiners in 2019
6. Silviculture, including Reforestation and Plantation Management	1. Clonal Propagation for Eaglewood. 2. Investigating seed propagation and agar wood formation of Papua New Guinea Eagle wood (<i>Gyrinops ledermannii</i>): Seed germination and fungi efficacy. 3. Variation in soil moisture, pH and texture in cultivated eaglewood (<i>Gyrinop</i> sp) sites. 4. The potential effect of different hormone concentrations on the root initiation and development from stem cuttings of <i>Santalum macgregorii</i> 5. The reliability of determining accurate volume from green weights of merchantable Klinkii logs.	J. Beko J. Beko J. Beko J. Beko L. Veisami, E. Maiguo & M. Peki	On-going On-going On-going On-going Mphil submitted in 2019

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7. Agro-forestry/ Social and Community Forestry and Multiple land-use	1. Motives for grassland burning and the consequent threat status in Markham Valley.	H. Jeremiah	Not Known
8. Wood Science and Technology; Timber Production/Utilisation	1. Physical Wood Strength of <i>Anisoptera thurifera</i> for Constructional use in Papua New Guinea. 2. Wood strength testing to use in the design of house and bridge structures. 3. Strength Dynamics of <i>Araucaria cunninghamii</i> (Hoop) from Bulolo Forest Plantation 4. Physical, Mechanical and Wood Working Properties of <i>Trema orientalis</i> (L) Blume in PNG.	P. Edwin P. Edwin P. Edwin S. Komut & M. Peki	On-going On-going On-going Mphil Re-enrolled 2019
10. Forest Policy, Economics and Forest Product Marketing	1. Role of Policy in Export Trade of Round logs in PNG, Guyana and Gabon.	H. Jeremiah	Not Known
11. Appropriate Technology	1. Mini-Pro Solar Kiln Timber Dryer – Drying of hardwood timbers using solar energy (low power consumption) technology.	P. Edwin & O. Pendis	On-going

POSTGRADUATE RESEARCH PROJECTS IN 2019

In 2019, the Department had on record twenty-one (21) postgraduate research studies being undertaken either as an on-going program; in the final stages of submission of thesis; corrections being carried out; or candidates being graduated. Most of these studies were undertaken by students from outside organisations including the PNG Forest Authority; PNG Forest Research Institute; and the New Guinea Binatang Research Center. These researches have been undertaken at MSc, MPhil, and PhD levels. In 2019, Sixteen (16) postgraduate students undertook MPhil studies; two (2) postgraduate students studied for an MSc; and One (1) student undertook a PhD study by research. Since nine (9) of these postgraduate studies have been successfully completed and those students undertaking the various studies have submitted their thesis towards the end of 2018, the Forestry Department recorded nine (9) of the candidates successfully graduating in 2019.

As at 2019, Eight (8) postgraduate students were continuing with their research either at Mphil or MSc levels at the Forestry Department with two (2) students successfully completing their studies and submitting their thesis towards the end of 2019 (Louis Weisami and Constin Bigol). The other postgraduate research studies are on-going and will be continued in 2020 (Table 3).

Table 3: Postgraduate Research Projects - 2019

#	STUDENT NAME	PROGRAM	THESIS / RESEARCH TOPIC	PRINCIPAL SUPERVISOR	EXTERNAL SUPERVISOR	2019 STATUS
1	Jacob Yombai	Mphil/2	Diversity and community composition of ants (Hymenoptera: Formicidae) in the forest of Papua New Guinea.	Prof. O.G. Gideon	V. Novotny	Graduated in 2019
2	Gewa Gamoga	MPhil/2	Measuring Forest use change in PNG 2000-2015	Dr. Mex Peki	Dr. Ruth Turia	Graduated in 2019
3	Dambis Kaip	MPhil /2	Forest Policy now and then	Dr. Mex Peki	Dr. Ruth Turia	Graduated in 2019
4	Constin Bigol	MPhil/2	The Role of Indigenous Knowledge in Forest Management: Implication for the Multi-purpose National Forest Inventory in PNG	Dr. Mex Peki	Dr. Ruth Turia	Thesis submitted in 2019
5	Steven Komut	MPhil/2	Physical, Mechanical and Wood Working Properties of <i>Trema orientalis</i> (L) Blume in PNG	Dr. Mex Peki	Professor M Hossain	Re-enrolled in 2019
6	Grace Luke	Mphil	The importance of latex as a defence against folivorous insects in a tropical rainforest	V. Novotny	Prof. O.G. Gideon	Graduated in 2019
7	Leroy Moripi*	MPhil/2	Modeling of Forest Soil Carbon on Primary Forest Types in Morobe Province using Terrain Attributes	Dr. Mex Peki	Dr. Peter McIntosh and Mr. Nalish Sam	Submitted to examiners
8	Bulisa Iova	Mphil/2	The effect of habitat types on bird communities in different elevations throughout Papua New Guinea. Exploration of Beta-diversity, Alpha-diversity and abundance'	N. Novotny	Prof. O.G. Gideon	Graduated in 2019

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9	Koniel Towalis	MSc/2	Investigating combustion characteristics of three native timbers: <i>Pometiappinnata</i> ; <i>Intsiabijuga</i> ; and <i>Araucaria cunninghamii</i> as the source of bioenergy.	Mr. Benson Gusamo	Prof. Julian C. Fox (ANU), Dr. Kulala Mulung (DERST)	Graduated in 2019
10	Reedley S. Opasa*	MPhil/2	Fruit fly community observation and assessment in PNG forests for forest health analysis	Mr. Rapo Pokon	Prof. Novotny	Active
11	Jason Paliau*	MPhil/1	Using distribution of geometridae moths to understand the changes in forest along the latitudinal gradient in PNG	Mr. Rapo Pokon	Prof. Novotny	Active
12	Gibson Sasonika*	MPhil/2	Patterns of Fern Species Richness and Beta Diversity in Highlands Ecosystems of PNG	Prof. OG Gideon	Prof. Novotny	Graduated in 2019
13	Miller Kawanamo*	MPhil/2	Tree species diversity and forest structure in different vegetation types and disturbance levels	Prof. OG Gideon	Prof. Novotny	Making corrections
14	Enock Kaledimimo*	PhD	Modern and traditional resource ecology of culturally and socially important tree species in PNG (to be further refined)	Prof. OG Gideon	Prof. Novotny	Has not re-enrolled, status unknown. He has not responded to emails
15	Heveakore Maraia	MSc/2	Review of the Genus <i>Ixora</i> (Rubiaceae) in the Papusia region, with an exploration of sources of species including flower-dependent niche partitioning	Prof. OG Gideon	Prof. Novotny	Graduated in 2019

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16	Samson Aguadi	MSc/2	Plant identification via digitized leaf pattern recognition	Prof. OG Gideon		Graduated in 2019
17	Anthony Troy Turagavuli	MSc/2	Technique for Improving Seed Germination of Papua New Guinea Sandalwood (<i>Santalum macgregorii</i>) (F.v. Muell).	Prof. OG Gideon	John Beko	Writing Thesis
18	Louis Weisami	MPhil/2	The reliability of determining true volume from green weight relationship for Klinkii pine logs	Eko Maiguo	Dr Mex Peki	Thesis submitted in 2019
19	Daniel Okena	Mphil/1	Ecology of Mammal Communities Along Altitudinal Gradient in Papua New Guinea	Prof. O.G. Gideon	Prof. Novotny	Enrolled in Sem 2, 2019
20	Gabriel Petual	Mphil/1	Ecological role of alien species in early successional vegetation along a rainforest altitudinal gradient in Papua New Guinea	Prof. O.G. Gideon	Prof. Novotny	Enrolled in Sem2, 2019
21	Hayden Wagia	MPhil/2	The effect of 20-years El Nino extreme on the dynamics of lowland tropical rainforest in Papua New Guinea.	Dr. M. Peki	Prof. Novotny	Currently attending course in Czech Republic

UNDERGRADUATE RESEARCH PROJECTS IN 2019

Table 4: Final Year Student Research Projects

No.	Student Name	Title	Principal Supervisor(s)	External Supervisor
1	Ngala Roddy	Trial Transesterification of crude oil extract from <i>Moringa oliefera</i> seeds for <i>Bio-diesel Production</i>	Mr. B Gusamo	
2	Israel Saliambari	Investigating root development and establishment of <i>Eucalyptus Pellita</i> seedlings with some commonly used nursery pots in PNG	J Beko and H Jeremiah	
3	Thomas Suan	Fertiliser trials on Eucalyptus pellita and E. deglupta at Markham Valley	Dr. M Peki	
4	Sokol Adrian	Germination rate of <i>Moringa Oliefera</i> seeds with coconut husk	H Jeremiah and J Beko	
5	Kaiko Esther	Site to species matching: Early Growth and survival of Pine and Eucalyptus species along Bulolo Valley.	Mr. J Beko	Mr. Mondo Kamar
6	Kono Joe	Development of volume equation for <i>Tectona Grandis</i> (Teak) in PNG.	Dr. M Peki	Mr. Mondo Kamar
7	Philip Moses	Investigating productive potential of cocoa grown under different shade of agroforestry system.	Prof. M Jashimuddin and H Jeremiah	
8	Toboga Grace	Estimating Above-ground biomass in tropical lowland <i>Anisoptera</i> dominated forest in PNG: "Using dipterocarp allometric equation".	Dr. C Yosi	
9	Linson Samson	Estimating above ground biomass and carbon stocks in tropical lowland <i>Anisoptera</i> dominated Forest in PNG: "Using generic allometric equation for wet tropical forests".	Dr. C Yosi	
10	Papali Timothy	Estimating biomass and carbon in <i>Pinus caribaeae</i> stands in Bulolo-Wau plantations	Dr. M Peki	
11	Kaime Robert	Study the Changes taking places on Forest Cover at North Waghi District, Jiwaka Province	Mr. L Wana	
12	Siwi Jack	Case Study into development of a logging code of practice in PNG to reduce impact logging in Plantation harvesting	Dr. C Yosi	
13	Warambukia Philemon	The Effect of El-Nino Drought on Plant Diversity and Structural Dynamics of Lowland tropical rainforest in Northern New Guinea (Wanang).	Prof. O Gideon	

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14	Sobaim Angelo	Inoculation of <i>Eucalyptus pellita</i> seeds and seedlings with fungal entomopathogen <i>Beauveria</i> spp.	Mr. R Pokon	Dr. R. Dotaona
15	Tohichem Leo	Fire Danger and Fire Weather Index Assessment for the Bulolo Wau Forest Plantations	Prof. M Jashimuddin	
16	Simon Melissa	Assessment of <i>Azadirachta indica</i> (Neem) with <i>Araucaria cunninghamii</i> (Hoop) to Prevent Termites Attack of Commercial Species in Bulolo/Wau Plantations	Mr. R Pokon	
17	Atime Gideon	Determination of Erodibility Index (K) Of Soil along Wara Simbu river in Simbu Province.	Mr. L Wana	

ON-GOING RESEARCH COLLABORATION WITH EXTERNAL PARTNERS

Apart from internally funded research programs, Forestry Department has been blessed with a number of opportunities to conduct collaborative research with external partners over the last five years.

As at 2019, Forestry Department had four (4) on-going research collaboration with external partners. These research projects have been supported by international organisations including the Australian Center for International Agricultural Research (ACIAR); European Union-Food and Agricultural Organization of the United Nations (EU-FAO); and the Asia Pacific Network for Global Change Research (APN).

The details of Forestry Department's internationally supported research projects and members of the staff who are currently participating in these projects are given (Table 5).

Table 5: Research Collaboration with External Partners

RESEARCH PROJECT TITLE	SPECIFIC RESEARCH TOPIC / PRINCIPAL INVESTIGATOR	COLLABORATION PARTNERS	FUNDER / SPONSOR	2019 STATUS
1. Improving the Papua New Guinea balsa value chain to enhance smallholder livelihoods (FST 2009/16) (include the duration of the project)[ACIAR PROJECT]	Trial Utilization of Balsa End Grain-Panel as Core Material for Door Making, Furniture Component, Packaging and Bee Hive Boxes: An Implication for Creating Balsa Market Opportunity in Papua New Guinea (<i>Benson Gusamo</i>)	ACIAR; University of Melbourne; UNITECH Forestry Department; PNG FRI; TFTC	Australian Center for International Agricultural Research (ACIAR)	Completed in 2019
2. Technical support to the Papua New Guinea Forest Authority to implement a multi-purpose National Forest Inventory (GCP/PNG/006/EC) (March 2013 to March 2019) extended [EU FAO PROJECT]	Most of the research activities here are done by FAO –PNGFA sponsored Post Graduate Students (see Table 1).	FAO; Sapienza University; University of Queensland; Forest Practices Authority-Tasmania; UNITECH Forestry Department; UPNG; New Guinea Binatang Research Centre; PNGFA; PNG FRI	EU-FAO; Mountain Partnership; The Crawford Fund	Completed in March 2019.
3. Enhancing Value Added Wood Processing in Papua New Guinea (FST/2012/092) (July 2014 to 2018. [ACIAR PROJECT]	1. Comparing Physical and Mechanical Properties in the Sapwood and Heartwood of <i>Terminalia brassii</i> in Unitech Plantation (Mex Peki & Undergraduate student).	ACIAR; University of Melbourne; UNITECH Forestry Department; PNGFRI; TFTC	Australian Center for International Agricultural Research (ACIAR)	Completed in 2019

	<p>2. A Role of Industrial Wood Preservation Practice on Mitigating Climate Change (Benson Gusamo).</p> <p>Current staff from DOF Unitech who are involved in this Project: Dr. Mex Peki – Team Leader Unitech Partner Institute Mr. Benson Gusamo – Researcher & Research Project Objective 2 leader Mr. Haron Jeremiah – Researcher Mr. Peter Edwin – Researcher (on PhD studies Melbourne) Mr. Ono Pendis – Research Officer (ACIAR).</p>			Completed in 2019
4. APN Research Project: Effective Models for Payment Mechanisms for Forest Ecosystem Services in PNG, Philippines and Thailand.	<p>Payment for Forest Ecosystem Services (PFES) in a community-managed forest in PNG: A case study in Sogeram, Madang Province. Henry Scheyvens – IGES, Japan Cossey Yosi – Unitech, PNG Mark Winai – FPCD, PNG Stewart Serawe – FPCD, PNG</p>	Asia-Pacific Network for Global Change Research (APN); Institute for Global Environmental Strategies (IGES); UNITECH Forestry Department; Foundation for People and Community Development (FPCD)	Asia-Pacific Network for Global Change Research (APN)	Completed in 2019. Final Report Published

LIST OF PUBLICATIONS IN JOURNALS - 2019

Our Academic staff in the Department have involved in publication of scientific articles in 2019. The details of these publications are contained in Table 6.

Table 6: Forestry Department List of Publication in 2019

STAFF NAME	PUBLICATION DETAILS
Professor O.G. Gideon	Maraia, H., Orsak, L.J., Gideon, O.G., & Okpul, T. (2019). An update on the distribution and morphology of <i>Ixora amplexifolia</i> (Ixoroideae, Rubiaceae) in Papua New Guinea. <i>Phytotaxa</i> , 409(3), 172 - 178 (published online).
Benson K. Gusamo	Wagi, R. & Gusamo, B.K. (2019) Antimicrobial activity of crude oil extracts from fruits of <i>Cynometra ramiflora</i> Linn and <i>Pandanus conoideus</i> Lamk from Papua New Guinea against ten pathogenic micro-organisms. <i>Academia Journal of Medicinal Plants</i> , (7)10:236-242. DOI: 10.15413/ajmp.2019.0156.
Professor Mohammed Jashimuddin	Islam, K., Nath, T.K., Jashimuddin, M., & Rahman, M. (2019). Forest Dependency, Co-management and Improvement of Peoples' Livelihood Capital: Evidence from Chunati Wildlife Sanctuary, Bangladesh. <i>Environmental Development</i> , 32, 1-15. https://doi.org/10.1016/j.envdev.2019.100456 [ELSEVIER] Islam, K.N., Rahman, M.M., Jashimuddin, M., Hossain, M., Islam, K., & Al Faroque, M. (2019). Analyzing multi-temporal satellite imagery and stakeholders' perceptions to have an insight into how forest co-management is changing the protected area landscapes in Bangladesh. <i>Forest Policy and Economics</i> , 101: 70-80. https://doi.org/10.1016/j.forpol.2019.01.011 [ELSEVIER]
Dr. Cossey K. Yosi	Scheyvens, H., Winai, M., Serawe, S., & Yosi, C.K. (2019). Effective Models for Payment Mechanisms for Forest Ecosystem Services in Madang Province in PNG. In: <i>Kawasaki, J. and Scheyvens H. (Eds.). Effective Models for Payment Mechanisms for Forest Ecosystem Services in Papua New Guinea, Philippines and Thailand</i> . Kobe, Japan: Asia-Pacific Network for Global Change Research (APN) and Institute for Global Environmental Strategies (IGES).

SEMINAR /WORKSHOP AND CONFERENCE

FORESTRY DEPARTMENT SEMINARS HELD IN 2019

The Forestry Department Seminars for 2019 has been successful and attracted three (3) presenters or researchers outside of the University representing different organisations. One (1) presenter was from the University of Minnesota in America and Two (2) of the national presenters were from Non-Government Organisation based in PNG, being FORCERT and PNG Forest Stewardship Council (PNG FSC). Table seven (7) gives details of the seminar presentations.

As part of the Department Seminar, three (3) postgraduate students studying for their MPhil were able to present their researches at Department level which was an opportunity for them to prepare themselves for the 2019 University Annual Postgraduate Conference.

All the details of the seminars held at the Forestry Department in 2019 are provided in Table seven (7) below;

Table 7: Forestry Department Seminar Conducted in 2019

DATE	PRESENTERS NAME	ORGANISATION	PRESENTATION TITLE	2019 STATUS
25/02/2019	Professor George Weiblen	University of Minnesota, USA	ForestGEO in PNG: insight from Global Earth Observatories on Forest Dynamics in a Changing World.	Seminar delivered
07/08/2019	Peter Dam	FORCERT	Sustainable Forest Management; Certification; Land Use Planning; and HCVF Assessment.	Seminar delivered
07/08/2019	Steven Magil	PNG FSC	Working with Business and Government and NGOs to halt deforestation and promote responsible forest management	Seminar delivered
	NAME OF POSTGRADUATE STUDENT	PROGRAM	PRESENTATION TITLE	2019 STATUS
02/10/2019	Louis Veisami	MPhil/2	The reliability of determining volume from green weights of <i>Araucaria hunsteinii</i> K. Schum merchantable logs	Seminar delivered
04/10/2019	Gabriel Petual	MPhil/1	Ecological role of alien species in early successional vegetation along a rainforest altitudinal gradient in Papua New Guinea	Seminar delivered

04/10/2019	Alfred Mani	MPhil/1	Research Proposal	Seminar delivered
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STAFF SEMINAR PRESENTATIONS OUTSIDE THE FORESTRY DEPARTMENT

Apart from our Department Seminar, Department staff have also attended and participated in various seminars and workshops both at the University and also outside of the University in 2019. The details of the seminar participation by the Department staff in 2019 are given below;

Presentation of Research Papers:

NIL

Workshop, Seminar and Conference Attendance:

1. Dr. Mex Peki attended the following workshops in 2019;

- a) Workshop on developing operational plan to achieve PNG University of Technology Strategy Plan from 15 – 16th October 2019 at RKLT
- b) Inception Workshop on Project “Strengthening capacity in the agricultural Forestry and land use sectors for enhanced transparency (CBIT) in implementation and monitoring of PNG’s Nationally Determined Contribution (NDC)” and official launching of PNG’s First Biennial Update Report (BUR1) to the UNFCCC – 22nd - 23rd October 2019, at Laguna Hotel, Port Moresby.
- c) Attended and organised a conference hosted by a Forestry Department, sponsored by FAO, UNDP and other National Forestry Inventory (NFI) project partners here on the Campus from 2nd to 03rd April 2019. During the opening ceremony, the EU Ambassador handover about USD150, 000 worth of training equipment to UniTech as part of their assistance to the Forestry Department.
- d) Attended Final workshop for EU- FAO NFI project in Port Moresby at Laguna Hotel, 28th August 2019
- e) Attended 30th Anniversary celebration seminar for the PNG Forest Research Institute from 29th to 30th August 2019 in Lae.

- f) Attended the South Pacific Institute for Sustainable Agriculture and Rural development, Seminar 2019. Held at The PNG University of Technology, Lae, on 03rd October 2019.

2. Workshops and Courses attended by Dr. Cossey Yosi in 2019:

- a) In terms of my participation in conferences and seminars, I have participated as a Session Chair in the National Forest Inventory Research Conference, held at PNG University of Technology from 2-3 April, 2019.
- b) Attended 30th Anniversary celebration seminar for the PNG Forest Research Institute from 29th to 30th August 2019 in Lae.
- c) In the second semester of 2019, I have participated in the Postgraduate Certificate in Teaching in Higher Education course. This course was delivered throughout the second semester by the University's TLMU. I have successfully completed the course and met all the requirements and will be graduating in April this year, 2020.

CONSTRAINTS

World-competitive research today occurs only when certain, mandatory infrastructure is present. Because forestry relies so much on field work, reliable personal transport (4-wheel drive vehicle) is our foremost constraint. While lab space and overall research funding are general issues at PNGUoT, high quality research is often possible in forestry at surprisingly low cost and our lab space is good compared to other departments.

Less mentioned but probably most fundamental to achieving world-competitive research, however, is access to relevant primary literature. This is woefully inadequate at PNGUoT: we rely on antiquated interlibrary loan hardcopies which themselves are limited, plus a few free access journal networks provided by non-profit institutions that do not access many forestry journals. In contrast, researchers overseas enjoy electronic access via an

appropriate level of subscription to the Web of Science that would include a spectrum of high calibre Forestry and related journals.

Expatriate faculty, and certain senior national faculty suffer less from this deficiency if they have library connections (via overseas schools they attended, overseas advisors they studied under, etc.), or can pull in literature during overseas annual leaves (i.e. Expatriates). Faculty lacking such connections are at a disadvantage within the Forestry Department and more generally in the university. Currently it is the national faculty who have not recently gone on overseas study leave who suffer disproportionately; it is essential that this inequality be recognized and addressed through much-improved university-wide access to primary literature.

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

Acting Head of Department: Mr John Lanta

Introduction

The two-core functions of the University that is related to academia is Teaching and Research. Whilst teachings have been adequately covered with the staff, we have on hand year in year out, research has been our weakest in general. Several factors that contribute to this:

- (i) Most staff mainly citizen staff have qualifications no higher than Master's degree. Therefore, research experience is very limited and writing a paper for a journal is almost impossible without supervision and direction. Therefore, they look upon the non-citizen staff to take lead and provide the opportunity.
- (ii) With the exception of a few, most non-citizen staff we have had so far helped out mostly in the teaching function and so provided little to no help in the research area. Two reasons from my observation, one either the non-citizen staff we recruited have no experience themselves in producing research papers or two, very conservative in opening to invite citizen colleagues for possible post graduate research opportunities. This has limited the growth of research in this department for ages.

1. Area of specialization for the academic staff members.

Mr. John Lanta	Differential equations
Dr. Chris Wilkins	Probability theory
Prof. Dr Mihail Ursul	Topological groups and rings, applications of topology, Banach algebras, Abelian groups
Dr. Moshen Aghaeiboorkheili	Partial differential equations
Mr. Raymond Kuna	Discrete mathematics, topological rings
Mr. Joel Tahie	Discrete mathematics, Boolean algebras and Boolean spaces

Mr. Isaac Angra	Cryptography
Mr. Boaz Andrews	Statistics
Mr. Benny Sipa	Computer Science
Mr. Benson Mirou	Computer Science – Software Engineering
Mr. Nicholas Puy	Computer Science
Mr. Nerit Lenz	Computer Science
Mr. Yaling Tapo	Computer Science
Mr. Sankwi Abuzo	Curriculum Management System
Mr. Samson Tom	Partial Differential Equations

2. Priority research areas of the Department:

Members of the Department are interested in the following domains of mathematics:

(a) Applied mathematics including areas: probability theory, ordinary and partial differential equations, numerical methods.

(b) Theoretical mathematics including topological rings, groups and lattices. Moreover, some members of the department are working in cryptography. Supplementary to this, the department has activated weekly departmental seminar in which new results from research paper are discussed. Senior staff members are giving lectures for young members of the department.

3. Research Projects of Post Graduate Students:

Student	Research topic	Founding Source	Supervisor
McKen Knox	Security of Diffie-Hellman based Encryption Schemes	Self-sponsored	Professor Lakoa Fitina
Joel Megusa Tahie	Bohr Topology on Boolean Rings	Self-sponsored	Professor Mihail Ursul
Isaac Angra	Secret Sharing Schemes Over Elliptic Curve Cryptography	Self-Sponsored	Professor Lakoa Fitina
Samson Tom	Partial Differential Equations	LNSDC	Dr Moshen Aghaeiboorkheili
SankwiAbuzo	Curriculum management System	LNSDC	Dr Wilkins
Benson Mirou (PhD)	Development of e-Crop Disease App for farmers in PNG (E-Agriculture)	LNSDC	Dr. Muhammad Talib A/Prof. Maino

4. The list of Journal publications

Remus, Dieter., Ursul, Mihail. (2019). Pseudocompact refinements of compact ring topologies. *Topology Appl.*, 259, 90-109 (MR 3958261; Zbl 142013057).

DEPARTMENT OF MECHANICAL ENGINEERING

Head of Department: Professor John Pumwa, PhD

Introduction

The Department of Mechanical Engineering considers engineering research to be very important as it leads to an expansion of knowledge and discoveries of new products and services. It is through research that leads to breakthroughs in engineering and technology. Research and experimental development comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications.

Engineering research is the systematic investigation and study of materials and sources to establish facts and reach new conclusions, so it shapes people's understanding of the world around them. Research involves testing hypotheses and predictions using testable data and a full battery of scientific and engineering tools and methods.

Focused Research Areas

The department has decided to concentrate and focus on the following areas of research in mechanical engineering:

- i. Design and Manufacturing*
- ii. Energy and Environment*
- iii. Materials Characterization*
- iv. Engineering Education and Management*

The department encourages faculty to conduct their research concentrating and focusing in the above areas.

Research Seminars

Departmental staff and postgraduate students are encouraged to present seminars regularly and as often as possible. The research coordinator is encouraged to schedule regular research seminars basing on the above areas of research interest.

Faculty Research Interests

The following Table provides research areas of interest for the current faculty members:

Academic Staff Members	Research Areas
Professor John Pumwa, Ph.D.	Tribology (Friction, Wear and Lubrication), Failure Analysis, Energy, Biodiesel, Vehicle Emission Effect on the Environment, Engineering Education.
Professor Nicholas Lambrache, Ph.D.	3-D modeling of weak parts and subsystems, Finite Element, Simulation on stresses – including dynamic stresses and fatigue, Fatigue experiments on computer controlled devices, Statistical interpretation based on accumulated data from the mine site, Material Science interactive research on minerals affecting strength of metal alloys in mining equipment.
Kamala K. Muduli, Ph.D.	Supply Chain Management, Sustainable Development, Operations Management, Health Care, Waste Management, Ergonomics.
S. Wahid, Ph.D.	Research in the Broader Area of Energy, Renewable/Sustainable Energy, Environment and Pollution, Heat Exchanger's, Behavior/Control of Heat Flow at the Interface of Materials, Tribology, MEMS in Energy Exchange Applications.
G M. Arshed, Ph.D.	Numerical Analysis, Fluid Dynamics
A. MOHMAED, Ph.D.	Corrosion

Shoeb Ahmed Syed, Ph.D.	Numerical Modeling, Computational Fluid dynamics and Heat transfer, Combustion, Fluid-Structure Interaction, Turbulence, 2 or 4 stroke reciprocating engines, Renewable energy
R.S. FonoTamo, PhD	Design and Manufacturing, Materials Development Characterization, Tribology.
Mr. Jack Khallahle	On Study leave
Mr. Samuel Dunstan	On Study leave
Mr. Steve Ales Korokan	On Study leave
Mr. Brian N'Drelan	Renewable energy – use of solar to provide power, efficiency management of renewable energy, Statistical analysis of Failure of mining equipment – study of the properties of the mineral being mined and the effects on life expectancy of equipment components, Safety Analysis of Causes of Accidents leading to analysis of design and even management of existing practices – looking at ethical implications.

Undergraduate Research Projects

The following are final year Mechanical Engineering Students projects offered in 2019 as part of their partial fulfillment of their degree:

Title No.	Suggested Description	Suggested by (Lecturer)	Number of Students
1	Production of Biodiesel Using Coconut Oil and costing analysis	Prof John Pumwa	Timana Garake, Branden Sipendi, Raymond Molo
2	Corrosion detection on Gas Pipeline	Prof John Pumwa	Bill Lata
3	Harnessing Solar and Wind Energy to Pump and purify Ground Water for the 40-mile Settlement	Dr Ghulam Arshed	Israel Serave, Stanley Anton
4	Autonomous Robot.	Prof Nicholas Lambrache	Eileen Rawali, Sharolyn Hungrabos, Leilani Laina, Lisa Wiambi
5	Vibrating Table for Mineral processing	Prof Nicholas Lambrache	Anthony Mark, Rocky Pombeken, Diana Watato

6	Characterization of Intergranular Corrosion of Inconel Alloy	Dr A Mohamed	Stanford Miukin, Nelson Thomas
7	Effect of Corrosive Environment in Oil and Gas Pipeline Industry	Dr A Mohamed	Gita-Kristie Korimbo, Oscar Tomati, Kelly Hibuya
8	Corrosion Control and Monitoring Technology for Structure of an Old Plant (30+ years old)	Dr A Mohamed	Frank Savannah
9	Corrosion Under Insulation in Oil and Gas on Offshore Rigs	Dr A Mohamed	Joshua Gett
10	Fabrication of Nanofiber for Nano-Medicine Tissue Engineering	Dr A Mohamed	Kenneth Oswyn, Harold Silonamo
11	Maintenance Inventory management (PNG Power Hydro Power Plants).	Brian N'Drelan	Benny Goi, Jonah Tokiong, Jesse Garu
12	Plant Layout Design Using Craft Algorithm	Prof K. Muduli	James Bayang, David Kawage, Anthony Papo
13	Life Cycle Assessment on Healthcare Waste Management and its Problems in LAE City	Prof K. Muduli	David Wambi, Amos Moses
14	Biogas Generation from Chicken Manure: An Assessment of Potential and Feasibility in Papua New Guinea.	Mr Karo Komuna	Leroy Pandi, Kingsley Sarip
15	Design of Water Supply for Rural Community and Solar Power Storage	Dr Syed Wahid	Joe Kupe, Jeremeel Gabby
16	Solar Moisture Condenser	Dr Syed Wahid	Dennis Lelang, Rawson Kusunan
17	Wind-Hydro Hybrid Power Plant for Wapenamanda District	Dr Syed Wahid	Tyson Gideon
18	Mini Hydro for Komkui Community	Dr Syed Wahid	Naptallian Napi, Malcolm Nama

Postgraduate Students Research

The following projects are being conducted by our Postgraduate Students:

Item	Research Projects	Status	PG student
1	Mechanical Component Failure in Inventory Management	Continuing	Brian N'Drelan (PhD)

2	Robotic Detection of Failure on Ferromagnetic Structures	Continuing	Peter Oyekola Oluwatosin (PG)
3	Chloride Enhanced Corrosion of Steel in Marine Environment of Papua New Guinea	Continuing	Rolland Mark (PG)
4	Investigating the Effect of Preventive Maintenance on Machine Reliability in a Beer Processing Plant	Continuing	Jacob Ben (PG)

List of Journal Publications

1. Arshed, G. M., & Khan, O. U. (2019). Problem-independent nonlinear switch for newly designed WENO-BO-Z scheme. *International Journal of Computational Fluid Dynamics*, 33(1-2), 59-76.
2. Biswal, J. N., Muduli, K., Satapathy, S., & Yadav, D.K., (2019). A TISM based study of SSCM enablers: an Indian coal- fired thermal power plant perspective. *International Journal of System Assurance Engineering and Management*, 10 (1), 126-141.
3. Fono-Tamo R. S. (2019). Predicting Heat Flux in Palm Kernel Shell Reinforced Brake Lining using Matlab PDE Toolbox. *International Journal of Mechanical and Production Engineering Research and Development*, 9 (4), 709-714.
4. Fono-Tamo, R. S. & Pumwa J. Y. (2019). Shear stress analysis in palm kernel shell Reinforced brake linings. *International Journal of Mechanical and Production Engineering Research and Development*, 9 (4).
5. Gaitu, K., Muduli, K., Apana, H., Aich, S., & Pumwa J. Y. (2019). The Issues Affecting the Correct Practice of Healthcare Waste Management in Lae's Angau Memorial General Hospital. *Indian Journal of Public Health Research & Development*, 10 (12), 551-556.
6. Mallick, P., Muduli, K., Biswal, J. N., Pumwa J. Y, & Oyekola P. (2019). Development of a Suitable Plant Layout using Computerised Relative Allocation of Facility Techniques, *International Journal of Recent Technology and Engineering*, 8 (2), 4956-4961
7. Mishra, S. S., Biswal, J. N., Muduli, K., Dash, M. R., & Pumwa J. (2019). Evaluation of Waste Management Practices of Health Care Units: A Graph Theoretic and Matrix Approach. *International Journal of Recent Technology and Engineering*, 8 (3), 4781-4786
8. Mohamed, A., Alrawashdeh, A. & Pumwa J. Y. (2019). The inhibition performance of thiadiazole derivatives on the steel corrosion: DFT and QSAR assessment. *The Journal of Corrosion Science and Engineering*, 22, 1-23.

9. Mohamed, A., Oyekola, P., & Pumwa, J. Y., (2019). Bicycle improvement: Flexible electric motor system. *International Journal of Recent Technology and Engineering*, 8 (3), 1209 – 1212.
10. Omoniye, Ezekiel B., Oyekola, P.O., Ovaha, O., Mohamed, A. & Lambrache, N. (2019). Bird feather removal machine: Design and development. *International Journal of Recent Technology and Engineering*, 8 (3), 406 – 410.
11. Omoniye, E., Oyekola, P., Muduli, K., Pumwa, J. Y., & Bara-Hart S. (2019). Analytical Research on Agility Index of a Manufacturing System. *International Journal of Recent Technology and Engineering*, 8 (3), 4753-4759.
12. Oyekola, P., Mohamed, A., & Pumwa J. Y. (2019). Robotic Model for Unmanned Crack and Corrosion Inspection. *International Journal of Innovative Technology and Exploring Engineering*, 9 (1).
13. Oyekola P., Mohamed, A. & Pumwa J. Y., (2019). Renewable Energy: Dynamic Modelling of a Wind Turbine. *International Journal of Innovative Technology and Exploring Engineering*, 9 (1).
14. Oyekola, P., Mohamed, A., Aforijiku, O., & Oyekola, E. (2019). Development and evaluation of fuel-less power generator. *International Journal of Innovative Technology and Exploring Engineering*, 9 (1), 862 – 867.
15. Oyekola, P., Oyewo, T., Oyekola, A., & Mohamed, A. (2019). Arduino based smart home security system. *International Journal of Innovative Technology and Exploring Engineering*, 8 (12), 2880 - 2884.
16. Wahid, S., Maika, N. (2019). Waste to Energy - Developing Countries, *JP Journal of Heat and Mass Transfer*, India, 17 (1), 59-75.

Publications (Conference)

1. Gaitu, K., Muduli, K., Pumwa, J., Apana, H., Biswal, N., Evaluation of Issues Affecting the Proper Practice of HCWM Systems in Lae's Angau Memorial General Hospital: An Analytical Hierarchy Process Approach, *ICRIET*, Brisbane, Australia, 8-9 June, 2019.
2. Lambrache, N., Pumwa, J., Wahid, S., Arshed, G., Olaru, L., N'Drelan, B., Maika, N., Russell, C. Pebuar, R. and Rombuk, R. (2018). Flow Control in Hydroelectric Plants. *Proceedings of SERI International Conference on Sustainable Energy*, Lae, Morobe Province, Papua New Guinea, June 27 – 28, 2018, Published in May 2019
3. Lambrache, N., Pumwa, J., Olatona, D., Ursul, M., & N'Drelan, B. (2018). Failure of Francis Water Turbines due to Flow Variations in Papua New Guinea. *Proceedings of the Second IEOM International European Conference*, Paris, France, July 26-27, 2018, ISSN 2169-8767, ISBN 978-1-5323-5945-3.

4. Lambrache, N., Pumwa, J., Renagi, O., Olaru, L., & N'Drelan, B. (2018). Stress Behaviour of Composite Materials with Natural Fibers from the South Pacific. *Proceedings of the Second IEOM International European Conference*, Paris, France, July 26-27, 2018, ISSN 2169-8767, ISBN 978-1-5323-5945-3.
5. Mohamed, A., Oyekola, P., & Pumwa, J. Y. (2019), Improved design of metered-dose inhaler techniques, *Proceedings of the International Conference on Industrial Engineering and Operations Management*, Toronto, Canada, October 23-25, pp. 480 – 486.
6. Oyekola, P., Lambrache, N., Mohamed, A., N'Drelan, B., & Ebere, C. (2019), Design and construction of an unmanned ground vehicle. *Proceedings of the International Conference on Industrial Engineering and Operations Management*, Toronto, Canada, October 23-25, pp. 487 – 496.
7. Wahid, S., Pumwa, J., Maika, N, (2019). Challenges of Engineering Accreditation: Developing Countries. *Proceedings of the AAEE2019 Conference*, Brisbane, Australia, 09-11 December, 2019
8. Wambi, D. Moses, A., Muduli, K., Pumwa, J., Biswal, N. (2019). Assessment of Health Care Waste Management Practices in Papua New Guinean Hospitals. *International Conference on Science, Technology, Engineering and Management*, Yogyakarta, Indonesia, December 28-29, 2019

DEPARTMENT OF MINING ENGINEERING

Head of Department: Dr Gabriel Arpa

RESEARCH REPORT NOT AVAILABLE

DEPARTMENT OF SURVEYING AND LAND STUDIES

Head of Department: Professor Jacob A. Babarinde

A. Priority Research Areas of the Department

The department's research activities revolve around the pivot 'Land and allied resources' optimum utilization, management and valuation, Climate studies, Disaster Risk Reduction and Disaster Risk Management. The department is primarily involved in the process of developing human resources adept in the holistic management of land resources and to eke out best value out of them in a sustainable manner through coordinated research activities. It is also actively involved in finding solution to Disasters Risks and Disaster Management, Disaster linked to climate change, tectonic activities. The human resources developed in the department have a wide exposure to the state of the art technology e.g. recent developments in the field of Remote Sensing, Geographic Information Systems, Photogrammetry, Global Positioning System / GNSS, use of latest Total Stations and allied implements of the digital era.

The department is also involved in several research programs including densification of Benchmark points for PNG using latest GPS / GNSS technology, GIS, remote sensing, and cartographic communication through development of thematic maps for PNG, property valuation and land management research programs as well as student projects.

Some specific areas are given below:

- 1) Climate change studies
- 2) Land suitability for Rice cultivation in PNG using Remote Sensing and GIS
- 3) Forest Biomass monitoring using Remote Sensing and GIS
- 4) Forests and Societal management
- 5) Inventorying Environmental Resources
- 6) Disaster Risk Reduction / Disaster Risk Management (DRR & DRM)
- 7) Urban sprawl detection
- 8) Groundwater mapping
- 9) Land use planning and management
- 10) Land Administration studies
- 11) Migration studies
- 12) Asset valuation studies
- 13) Cadastral Data Modeling
- 14) Management of incorporated land groups (ILG)
- 15) GNSS Survey and Vertical Adjustment of Madang Network
- 16) GIS In Customary Land Tenure Investigation
- 17) RS & GIS in Urban and Regional Planning
- 18) Mining and Its Impacts on Property Market
- 19) Residential Property Management
- 20) Public Educational Facility Management

- 21) Property Development Process in Papua New Guinea
- 22) Low Income Housing in PNG: Challenges and Opportunities
- 23) AHI land mobilization policy
- 24) Impacts on customary land owners under Plantation Redistribution Scheme
- 25) Impacts & effects of special agriculture and business lease (SABL) on customary land owners
- 26) Causes and effects of urban land values
- 27) Road Alignment (Horizontal/Vertical)
- 28) Drainage Design
- 29) Subdivision Design
- 30) Control Surveys using GPS/GNSS
- 31) Local Geoid study using GPS heighting on heightened MSL Benchmarks
- 32) GPS/GNSS to Cadastral Surveying in PNG
- 33) Infrastructure Development Surveys
- 34) Geodetic Control Surveying using GPS/GNSS
- 35) ILG (Integrated Land Groups) Customary Land Registration, etc.

B. Name of the Faculty Member/Position/Area of Specialization/Research interests

Name	Position	Area of Specialization
Prof. Jacob Babarinde	Professor and Head of Department	Asset Valuation/Appraisal & Estate Agency, Property Management & Development, Land Management/Administration, Urban & Regional /Rural Planning, Land Use & City Sustainability, Project Viability & Feasibility Studies, Intra-Urban Industrial & Residential Relocation/Mobility, Urban Policy Analysis, Environment & Energy Policy
Dr. Sujoy Kumar Jana	Associate Professor	Hazard and Disaster Management, Resource planning and Management, Geography and Management
Dr. Sailesh Samanta	Associate Professor	Remote Sensing, GIS, Climatology, Geography, Natural Disaster, Disaster management, Site Suitability, Environment, Renewable energy

Mr. Job Suat	Senior Lecturer	Remote Sensing, GIS, Cartography, Survey, Infrastructure Development Surveys, Cadastral Data Modeling, Survey Practice - Laws & Regulations.
Mr. Wycliffe Antonio	Lecturer	GIS, Cartography, Geospatial Database modelling and development
Mr. Suman Holis	Lecturer	Property Valuation, Property Development, Land Administration
Mr. Samudra Gupta	Lecturer	Physics of Remote Sensing, Digital Image Processing, Photogrammetry / Drone, Global Positioning System, Geoinformatics, Geodesy, Spatial Analysis in GIS, Critical Pedagogy in classroom learning
Dr. Andrew Pai	Lecturer	Property Valuation, Land Administration
Dr. Cathy Koloa	Lecturer	Planning, Spatial Modeling, Hazard Management, Hydro geomorphology
Mr. Lewi Kari	Lecturer	Vegetation monitoring, Remote Sensing, GIS, Digital Image Processing, Manual Image Processing, Aerial Photogrammetry, Geography, Cartography, CAD, ILG. Web Mapping, Route Analysis
Mr. Jerry Mille	Lecturer	Land Administration, Social Mapping, ILG Creation, Land Disputes & Settlement
Mr. Tingneyuc Sekac	Lecturer	Renewable and Clean Energy, Disaster Management, Climatology, Rural Development Planning, Urban Planning, Remote Sensing, GIS, GPS and GNSS
Mr. Robert Rosa	Lecturer	N/A
Mrs. Rosemary Adu	Lecturer	N/A

Mr. Navua Kapi	Lecturer	Engineering Surveys and Designs, Lease Surveys, Remote Sensing & Photogrammetry, Urban and Regional Planning & Subdivision, Mine Survey, Geodesy and GPS, Hydragraphic Surveying, UAV Surveying and Mapping, Deformation monitoring, Under water Lease Surveys, Construction Surveys, Rural and Urban Valuations, Survey Hardware and Software Maintenance and technician, Claims and BOQ for any Engineering and Construction services
Mr. Junior Tumare	Lecturer	N/A
Mr. James Seniala	Lecturer	Property Valuations, Property Management
Mr. Lepani Karigawa	Lecturer	Rural Valuation, Urban Valuation, Incorporated Land Groups, Property Management, Customary Land Registration
Mr. Paulus Mоторо	Lecturer (Temp.)	Property management, Property Valuation, Property Economics/Finance
Mr. Glan Yali	Lecturer (Temp.)	Natural Resource Management, Assets Management, Forest Carbon (Biomass) Assessment for REDD ++, Development Planning
Mrs. Camilla Yanabis Kwaudi	Senior Technical officer	Cartography, GIS DBMS, Web mapping
Mr. Heva Honeaki	Senior Technical Instructor	Hydrographic Surveying, Computer Aided Drafting, EDM Calibration, GPS GNSS, Cadastral Surveying, Automated Surveying
Mr. Stanley Tine	Senior Technical Instructor	N/A
Mr. Clifford Jr Mespuk	Senior Technical officer	Engineering Survey, ID Survey, Drainage Hydrology

C. List of Scientific Paper Publications in Peer Reviewed Journals

1. Akinbola. K. B., Babarinde. J. A., & Salau. T. I. (2019). Real estate and urban planning professionalism: the impact of entrepreneurship education on innate talent, self-employment propensity and consultancy practice. *Melanesian Journal of Geomatics and Property Studies*, ISSN (Online), 5(1), 2414-2557.
2. Antonio, W., and Charles, G.C. (2019). Achieving land development benefits on customary/communal land. *Land use policy*, 83, 124–133, <https://authors.elsevier.com/a/1YYhjyDvM7u2M>.
3. Joeli, V., Sekac, T., & Jana, S.K. (2019). Demarcation of liquefaction potential zones in Fiji Islands: A case study of Vitilevu Island. *Spatial Information Research*, Springer Publication, ISSN: 2366 – 3286 (print version) ISSN: 2366-3294. DOI: 10.1007/s41324-019-00265-1.
4. Joeli, V., Sekac, T., & Jana, S.K. (2019). Earthquake Hazard Micro Zonation in Fiji Islands: A Research of VitiLevu Island. *International Journal of Recent Technology and Engineering*, ISSN: 2277-3878, Volume-8, Issue-12S. DOI: 10.35940/ijrte.B1257.0982S1119
5. Joeli, V., Sekac, T., & Jana, S.K. (2019). Landslide Hazard Zonation from a GIS Perspective and Urban Planning Solutions in Central –Division of Fiji Islands. *International Journal of Innovative Technology and Exploring Engineering (IJITEE)* ISSN: 2278-3075, Volume-8 Issue-12S, October 2019. DOI: 10.35940/ijitee.L1091.10812S19
6. Kumne, W., & Samanta, S. (2019). Remote Sensing and GIS Application on Forest Resource Mapping and Monitoring in Bulolo District, Morobe Province. *Journal of Geoscience and Environment Protection*, 7, 37-48. <https://doi.org/10.4236/gep.2019.72003>
7. Mоторо, P., Babarinde. J. A., & Holis. S. (2019). Analysis of the Rental Market in Informal Settlements Complementing Housing Needs in Cities: The Case of Port Moresby and Lae Cities in Papua New Guinea. *Melanesian Journal of Geomatics and Property Studies*, ISSN (Online), 5 (1), 2414-2557.
8. Petrus, J., Babarinde. J. A., Karigawa. L. (2019). An Assessment of Land Taxation in PNG - A Case Study of Lae City. *Melanesian Journal of Geomatics and Property Studies*, ISSN (Online): 2414-2557 Vol. 5, Issue 1.
9. Poi, N., & Samanta, S. (2019). GIS, remote sensing and MCE approach for identifying groundwater prospective zones in mountainous region of PNG. *Applied Geomatics*, 11(3), 317-330. <https://doi.org/10.1007/s12518-019-00259-6>.

10. Renagi, O. & Babarinde, J. A. (2019). An Appraisal of PNG National Energy Policy 2018-2028. *International Journal of Energy and Environmental Research*, ISSN 2055-0197 (Print); ISSN 2055-0200 (Online), 7(2), 1-18.
11. Samanta, S., Pal, D.K. & Palsamanta, B. (2019). Modeling of Micro Level Solar Radiation Using High Resolution Topographic Data Through Remote Sensing and GIS. *International Journal of Geoinformatics*, 15(1), 1-11.
12. Seniela, J., Babarinde, J. A. & Holis, S. (2019). Cultural Lineage Constraints to Public Housing Affordability in Papua New Guinea. *Sustainability in Environment*, ISSN 2470-637X (Print); ISSN 2470-6388 (Online), 4(1), 56-74.
13. Tarutia. R., & Kari. L. (2019). Expert Classification of Land Use and Land Cover in Markham, Morobe Province (PNG). *Melanesian Journal of Geomatics and Property Studies*, ISSN (Online): 2414-2557, 5(1).
14. Wambi. W. J., Sekac. T., & Jana. S. K. (2019). Suitability Analysis for Potential Cocoa Cultivation in Southern Highlands and Hela Province of Papua New Guinea. *Melanesian Journal of Geomatics and Property Studies*, ISSN (Online): 2414-2557, 5 (1).

D. List of Conference Proceedings/Workshop/Seminar

1. Jana, S. K., & Sekac. T. (2019). Geo-spatial approach with frequency ration method in landslide susceptibility mapping in Papua New Guinea at ICT Japan Auditorium, USP, Fiji organized by Pacific GIS and Remote Sensing Council, 25th Nov, - 30th November 2019.
2. Jana, S. K., Sekac. T. & Pal D. K. (2019). Remote Sensing and GIS Approach in Channel Shifting Impacts on Urban Development: A Case Study of Lae Urban in Papua New Guinea, International Conference on Recent Innovation in Engineering and Technology (ICRIET), 8-9th June, Brisbane, Australia.
3. Joeli, V., Sekac, T., Jana, S.K. & Pal, D.K. (2019). Demarcation of Liquefaction Potential Zones in Vitilevu Island. Paper presented at the South East Asian Survey Congress – 2019 was held at the Darwin Convention Centre, Darwin, Australia, Organized by South East Asia Survey Congress, during August, 23 – 25, 2019.
4. Joeli, V., Sekac, T. & Jana, S.K. (2019). Flood Hazard Zonation in Vitilevu Island, Fiji. Paper presented at the Victoria University of Wellington, Wellington, New Zealand, Organized by OSGeo Oceania & FOSS4G SotM Oceania, November 12th – 15th, 2019.
5. Joeli, V., Sekac, T. & Jana, S.K. (2019). Flood Hazard Zonation in Vitilevu Island, Fiji. Paper presented at the University of the South Pacific, Laucala Campus, Fiji Islands, Organized by The Pacific GIS & Remote Sensing Council, November 25th – 28th, 2019.
6. Kari, L. & Bure, R. (2019): The consequence of not having a Spatial Data Infrastructure for PNG based on PNG2020 & LEaP in a modern PNG Economy. Paper presented at the

53rd Association of Surveyors Papua New Guinea (ASPNG) Congress, held at the Port Moresby Gateway Hotel, 17th to 19th July, 2019.

7. Muriki, M. & Kari, L. (2019). Application of Geographic Information Science (GIS)-3D geo-visualization and Participatory GIS in informal settlements Up-gradation by securing public spaces - A Case Study of Madang Block-Lae City, PNG. Paper presented at the 53rd Association of Surveyors Papua New Guinea (ASPNG) Congress, held at the Port Moresby Gateway Hotel, 17th to 19th July, 2019.
8. Poi, N., & Samanta, S. (2019), Identification of Ground Water Prospective Zones in the Highland of Papua New Guinea through Multi Criteria Evaluation Approach, UAC International December Conference in Bangkok, 19-20 December, Bangkok, Thailand.
9. Samanta, S. (2019). Use of High Resolution Topographic Data for Micro Level Solor Radiation mapping through Remote Sensing and GIS. Universal Academic Cluster, 13th June, Bangkok, Thailand.

E. Book Chapters in Professional Edited Books

Sekac, T., Jana S.K., Pal I., & Pal, D.K. (2019). Application of Geospatial Technology in Earthquake Risk Assessment in Papua New Guinea. Disaster Resilience and Sustainability. MRDRRE 2017. Disaster Risk Reduction (Methods, Approaches and Practices). Springer, Singapore. https://doi.org/10.1007/978-981-32-9527-8_12

F. Winning Project

Ongoing collaboration research Project: PIURN

Project Title

Towards National Drinking Water Standards in Vanuatu: Applied Research and Capacity Building

Research Team Members and Affiliations

Ø Dr Krishna Kumar Kotra, Lecturer, School of Biological and Chemical Sciences, FSTE, The University of the South Pacific (USP) – Principal Investigator

Ø Dr Sailesh Samanta, Associate Professor, Dept. of Surveying and Lands, PNG University of Technology (PNGUNITECH) – Co-Investigator / Co-funder

Ø Dr Srikanth Bathula, Senior Lecturer, Dept. of Applied Sciences, PNG University of Technology (PNGUNITECH) – Co-Investigator

Ø Mr Erie Sammy, Hydrogeologist, Dept. of Water Resources, Govt. of Vanuatu – Co-Investigator / Co-funder

Ø Dr Lokesh Padhye, Senior Lecturer, Oceania Water Research Consortium (OWRC), Dept. of Civil and Environmental Engineering, University of Auckland, New Zealand – Co-Investigator / Co-funder

Ø Dr Martin S. Andersen, Senior Lecturer, School of Civil and Environmental Engineering, and director of Connected Waters Initiative (CWI), University of New South Wales, Sydney, Australia – Co-Investigator / Co-funder

Budget: 43,311 Fiji Dollars

Project Duration: 2 years (01-10-2017 to 30-09-2019)

G. Undergraduate Research Projects

Year 4 BTSR Research Project 2019

SURNAME	NAME	Topic	Supervisor
KAMILA	PAMELA	Quantity Measurements – Stock Pile monitoring of Dekenai Construction crusher	Mr. Navua Kapi
KASOKASON	DARYL	Planning and Development Survey – PNG Unitech Campus	Mr. Navua Kapi
WIAVI	JAPHETH	Planning and Development Survey – PNG Unitech Campus	Mr. Navua Kapi
KOME	PENDENCE	The Comparation and Computation of ITRF92 Coordinates to PNG94 Coordinates of PSM's in Lae city by GNSS Technology.	Mr. Robert M Rosa
KUMUNO	MOGIA	Establishing new boundaries for residential area which extend to the vacant area, between Sogeri Drive through Vanua Tharana and the Habitat fence boundary and subdividing that vacant area into a residential area for Unitech staff.	Mr. Navua Kapi
PANK	NIGEL	A case study of Road Alignment in Unitech Campus.	Mr. Mela Popeu
PARAKA	JERRY	Re- networking and Establishment of the Geodetic Control Network within the Campus of UNITECH by using Precise Point Position (PPP) and transformation of coordinates from WGS 84 to PNG 94 on ITRF 2008.	Mr. Robert M Rosa / Mr. Navua Kapi
PETER	JESSYWEL	Establishing subsidiary controls to perform Detail Survey of Roads in Lae City to Design X- intersection. “A case study of Design X-intersection of Eriku Road”	Mr. Mela Popeu

SALKUT	TED	Drainage Design for Achernar Eve and Pegasi Parade.	Mr. Mela Popeu
AMU	SALAN	Storm water drainage design – A Case study of PNG UOT unconstructed storm water drainage along and near dumping areas.	Mr. Navua Kapi
MARK	ANDREW	Road Alignment Designs” for an existing road which are used as tracks to a standard road at the PNG Unitech Campus. Case study of Unitech Campus includes residual areas and every existing road and pavement linking one and other.	Mr. Navua Kapi
NORMAN	ELINA	Road Alignment Designs” along the southern portion o 425 and reserve for access route	Mr. Mela Popeu
NOSI	ROY	A Proposed Design of New Treated Sewerage System for Unitech.	Mr. Navua Kapi
OSIFELO	JIMMY	Determination of Catchment using DTM Survey	Mr. Navua Kapi
SIPILI	BRENDON	Hydrographic survey- updating the shore lines and proposing preventive measures of reducing the speed of erosion and sediment deposition around the bay’s vicinity.	Mr. Heva Honeaki
SULA	JACKSON	DRAINAGE SURVEY along the roads in Lae city, Morobe Province	Mr. Navua Kapi
WAKIO	MECKSON	Road and Drainage Design along Independence Drive	Mr. Navua Kapi
WALOM	EMMANUEL	Maximizing productivity for Unitech Farm using Surveying approach	Mr. Navua Kapi

Year 4 BGIS Students Research Project 2019

Student		Topic	Supervisor
ALUA	DOROTHY	Using least cost path analysis and Remote Sensing for routing power lines in Chimbu Province. a case study of Gumine District	Mr Kari
AMBU	SHANNON	Using GIS and remote sensing methods for strategic placement of campus security asserts in the Papua New Guinea University of Technology for effective and efficient protection for all residents.	Mr Gupta
API	HARDIE	Hydro potential study of Kornige water catchment area using GIS and RS techniques.	Mr Sekac

DOM	GAYA	Identifying earthquake harzard zones in Morobe Province in Papua New Guinea	Mr Sekac
DUA	WILLIE	Using GIS and Remote Sensing to determine Potential Cocoa Cultivation & Production in Goroka, EHP	Dr Jana
GALA	KONEX	Using GIS & RS in ensuring enforcement of law & order in Lae City	Mr Gupta
GAU	ROSE	Implementation of Web Mapping Site as platform of Viewing Academic Building Infrastructures on Unitech Campus	Mr Kari
GERRY	JESSICA	Estimation of Soil Loss Using Remote Sensing and Geographic Information System Techniques- Case Study of Wahgi River, Chimbu, Papua New Guinea	Mr Gupta
JUNO	DRUCILLAH	Application of RS/GIS in Multi Hazard Risk Assessment of Kumalu River, Markham Catchment Using Multicriteria Evaluation	Dr Jana
KINTAU	STANYS	Using Geospatial Technology into Assessing & Determining water quality of Groundwater Potential Sites: A case Study of Vanimo Town, West Sepik Province	Mr Sekac
MESKERE	MARRYANNE	Application of GIS/RS Techniques to Identify Surface Waterlogged Areas in Markham District in 2019	Mr Suat
MOREA	HUA	Application of RS/GIS techniques in flood-susceptibility area assessment for Kemp Welch Catchment in Central Province, PNG	Dr Samanta
OBOKO	HEJUMACLA	Integrating GIS/RS Techniques to Investigate Groundwater Potential Map of East New Britain Province, PNG	Dr Jana
PANE	BENEDICT	Mapping Above ground biomass (ABG) for Natural Forest Using Remote Sensing Data: A case study for Purari, Kikori District Gulf Province	Dr Samanta
PUNDI	PAUL	LULC Change detection of Taraka Campus PNGUOT	Mr Gupta
RIYONG	ROBIN	Utilizing GIS/RS in Forest Management- Case study of Bulolo Forestry	Mr Sekac
ROMAN	RAKA	INTEGRATION OF GIS Analysis for Flood Risk Mapping in informal settlement	Mr Suat

		along the Bumbu River Stretch: Case study of Bumbu Settlement	
SARWOM	JOHN	An Android Routing App for the Health Services in Lae City	Mr Kari
SAUEN	ERICK	GIS/RS Application for Assessment of Land Suitability Potential for Rice Crop: Case Study of Markham Valley	Mr Gupta
SINE	FREDDERICK	Biomass Productivity Modelling of the Markham PNG Biomass Project using RS/GIS Technology	Mr Gupta
SININ	EDITH	Power Pole and Line Distribution and Asset Management System using Web GIS and Remote Sensing in UNITECH CAMPUS, Lae City.	Mr Kari
TANDA	NEWTON	Splitting of Lagaip-Porgera electorate into two separate electorates as Laiagam and Porgera using boundary mapping tools in GIS mapping software's including MapInfo, Erdas Imagine, ArcMap, and Geomatica PCI.	Mr Suat
VUVUNO	AUGUSTINE	Site Suitability for Urban Solid Waste Disposal using GIS/RS techniques. A case Study of Port Moresby	Dr Samanta
WAFI	JIMAIMAH	Optimal Route of urban Water Supply System Pipelines using GIS and Remote Sensing Techniques: A Case Study of Wewak Urban, Ward 5 to Ward 16, ESP.	Mr Kari
YAWA	ROBERT	Utilizing GIS Techniques in Mapping Traffic Delay Issues along Specific Road Corridors and Intersections within Lae City	Mr Gupta

Year 4 Property Studies Research Project 2019

Surname	Name	Topic	Supervisor
ANGKAKI	EMMANUEL	An Investigation into Customary Land Dispute Resolution in Accordance with the Land Dispute Settlement Act 1975: A Case Study of Ahi Land Owners in Lae City.	Jerry Mille
BRUNO	JAYSON	Formalisation of Customary Land Tenure in Morobe Province: A Roadmap for Sustainable Economic Development.	Jerry Mille
FORNO	SELBY	The Political Economy of Illegal Occupation of State Land in Lae City.	Jacob Babarinde

GAVIA	MARY	Ernest Burgess' Concentric Model of Land Use: Is it Applicable to Cities in PNG?	Paulus Mоторo
HAILAI	ESTHER	Legacy Land Issues in PNG: A Major Hindrance to Infrastructure Development in New Ireland Province.	Paulus Mоторo
PAITA	SAMUEL	The Determinants of Rising House Rents in Lae.	Andrew Pai
PETER	EZEKIEL	Customary Land Dispute Settlement in PNG: A Case Study of Land Owner Groups and Porgera Gold Mining Company.	Jerry Mille
PORIKA	MARYANNE	Access to Customary Land in Port Moresby for Residential Property Development: Prospects and Challenges.	James Seniela
TOPE	JORNAL	Challenges Facing Customary Land Development in Lae City: A Case Study of Nadzab Area in Lae.	Paulus Mоторo
WAULAS	SOWEI	Strengthening the Capacity of the Land Administration Systems in PNG: A Case Study of Morobe Province.	Andrew Pai
WINGA	JUNITA	An Investigation of the SABLs and Land Grabbing in PNG: A Case Study of Palm Oil Industry in East New Britain.	Lepani Karigawa
WEMINDIM	PATRISON	Mining Industry in PNG and Its Impacts on Customary Land Owners: A Case Study of Hidge Gas, South Highlands Province.	Lepani Karigawa
KANAU	Kunera	An Exploration of the Effects of APEC Meeting on Real Estate Industry in Port Moresby.	SumanHolis
APIA	DONALD	Analysis of Customary Land Disputes in Guadalcanal Province, Honiara, Solomon Islands.	Jerry Mille
BINEKE	SHANE	Impediments to Sustainable Government Regulation of the Property Industry in PNG.	Andrew Pai
FONO	SERAH	Green Buildings for Sustainability and the Role of Real Estate Professionals: A Case Study in Port Mort Moresby.	Jacob Babarinde

HAITA	REBECCA	The Landlord and Tenant Act 1954 Part I and Its Impacts on Residential Property Values in Lae.	Jacob Babarinde
IAMUIA	KOIARI	Highest and Best Use Analysis in Practice: A Case Study of Lot X in Lae Downtown.	SumanHolis
NANA	EDDIE	Impact Assessment of Agricultural Development Projects on Customary Land in PNG – A Case Study of Markham Oil Palm Plantation.	Andrew Pai
PHILIP	EDA	Is Land Registration a Panacea for Protecting Customary Land from Land Grabbing?	James Seniela
TENE	RACHAEL	Are Oil Palm Operations a Threat to the Baining Landowners in East Britain?	James Seniela
WALANO	JOEL	Special Agricultural Business Leases and the Search for Sustainable Tenure Less Than 99 Years: The Case of ERAP in Markham, Lae.	Lepani Karigawa
WANJAL	ELIZAH	An Investigation into the Commercial Property Manager's Role in Asset Performance through Active Management: A Case Study of Lae International Hotel.	Jacob Babarinde
SINNE	JAMES	An Exploratory Research into the Feasibility of Public-Private Partnerships in Multi-Tenanted Family Dwellings/Apartments in PNG: A Case Study of Lae City.	SumanHolis
MAINADI	ROBERT	Speculative Residential Property Development: Feasibility and Impact Parameters in Alotau, PNG	SumanHolis
ANATASIA	DUDUAL	Evaluation of Land Information System (LIS) in PNG: A Case Study of Ramu and Markham Valleys.	Lepani Karigawa

H. Postgraduate Students Research Project, 2019

PG Student Research Project 2019 those who will get their degree in upcoming Graduation 2020

SL No	Name of the Students	Project Title	Discipline	Supervisor(S)
1	DAVID KOPIO	Above Ground Biomass and Carbon Stock Analysis	M. Sc in Remote Sensing & GIS	Dr. Samanta
2	EMMANUEL HENRY	Monitoring Settlement Growth in Lae city using Remote Sensing & GIS	M. Sc in Remote Sensing & GIS	Dr. Jana
3	GOMA WILLIE	Landslide Potential Zonation Using RS & GIS- A Case Study in Chimbu and Eastern Highland Province of PNG	M. Sc in Remote Sensing & GIS	Mr. Sekac
4	WILLI AWAT	Application of Space Technology to Identify Suitable Landfill for Solid Waste Disposal in Madang Town-PNG	M. Sc in Remote Sensing & GIS	Mr. Sekac
5	BOB KABAJA	Land Suitability Analysis Using Remote Sensing and GIS Techniques to Determine Potential Coffee Cultivation in Southern Highlands Province of Papua New Guinea	M. Sc in Remote Sensing & GIS	Dr. Jana
6	GODWIN MURIKI	Application of Geographic Information Science 3D visualization in informal settlement upgrading by securing public space in Madang Block – Lae City	M. Phil in Geomatics	Mr. Kari
7	CLIFFORD MESPUK JR.	Designing Storm Drainage System of Independence Drive: A case study between Unigate and Igam Junction	M. Phil in Surveying	Mr. Kapi
8	CAMILLA .Y.KWAUDI	An Interactive Crime Mapping System of PNG Unitech Campus	M. Phil in Geomatics	Mr. Kari
9	JEFFREY PETRUS	An Assessment of Land Taxation in PNG : A Case Study of Lae City	M. Phil in Property Studies	Prof. Babarinde

ALLOCATION OF RESEARCH FUND 2019

Applicant/Supervisor	Department	Sponsor	Title	Amount (K)
John Milba, MCS/2 (Dr F. Essacu)	Communication and Development Studies	GAP	The role of communication in enhancing participatory and sustainable forest management practices in Papua New Guinea: A perspective from timber rights purchase and forest management agreement application process in Morobe Province.	K2, 950.00
Anthony Troy Turagavuli MPhil/2 (Prof O. Gideon)	Forestry	BULA	Techniques for Improving Germination of Papua New Guinea Sandalwood (<i>Santalum macgregorii</i>)	K8,140.00
Samuel Dusntan PhD/3 <i>Unitech Staff studying in UK</i>	Mechanical Engineering	LNSDC	(Living Expense support)	K30, 000
Camari M. Divuniqawa, MSc/2 (Dr R. Rao)	Agriculture	BULA	Effects of Biochar on Nickel Polluted Soil	K8,978.00
Loretha Salmartin (MSc/1)/ (Prof. Tom Okpul)	Agriculture	GAP	Identification and development of Genetics Markers associated with cross-incompatibility in sweet potatoe.	K8, 511.00
(Dr. Senthilkumar Velusamy) Mathew Waimbo (MPhil student)	Applied Physics	LNSDC	Development of Nanostructured metal Tungstates for Visible Light active Photocalytic Material Applications	5, 300.00
Mr Roberto Soto (PhD/2 & Staff)	Applied Physics	Self	Ionisation Radiation Dose to the Population in major cities of PNG	5,000.00

PNG University of Technology

Spencer Poloma - (PhD/1) (Dr. Macquin Maino)	Agriculture	Self	Effects of mycorrhizal symbiosis on macro nutrients absorption, physiological parameters and yield of rice (<i>Oryza sativa</i> L.)	5,000.00
Kaupā Philip, (Lecturer)	Applied Science	Staff	Design of Mini-Bio-adsorption Water Treatment Plant	6,740.00
Benson Mirou (PhD/2) (Dr. Muhammad N. Talib/Dr. M. Maino)	Mathematics & Computer Science	LNSDC	Developing of e-Crop Disease App for farmers in PNG	7,122.88
Dr Ken Ael (Staff)	Mining Engineering	Staff	Assessing the Strategies for Designing a Sustainable livelihood in the Post-Mine Era in the Porgera Region of Papua New Guinea	6,450.00
Sheryl Makara (PhD Student)	Communications & Dev. Studies	Student	Being, Belonging and Resilience: Young People Making it Work in Papua New Guinea	5,000.00
Lisa Paskalis (MSc/1) (Prof. Tom Okpul)	Agriculture	GAP Student	Investigating the Inheritance pattern for gene(s) conferring resistance to the storage Weevil, <i>Sitophilus Zeamais Motchulsky</i> from a locally inbred maize population in Papua New Guinea	9,950.50
Sylvester Tirones (MTech/1) (Dr Moses Kavi)	Electrical and Communication Engineering	GAP Student	Design of Advanced Battery Management System	8,417.60
Peter Oyekola (M.Eng/1) (Prof. Nicholas Lambrache)	Mechanical Engineering	ACU	Development and Design of Autonomous Robots for Failure Detection and Environment Exploration.	18,550.00
TOTAL				136,108.50

CONFERENCE FUND 2019

Applicant	Department	Title	Amount (K)
Dr Gary Sali (Staff & HoD)	Communication and Development Studies	2019 PNG Updates conference at UPNG, 7 th - 9 th August 2019. <u>Paper Title:</u> <i>Application of the death penalty in PNG: Will it reduce escalating law and order problems or not?</i>	3, 128.10
Joeli Varo (PhD/4)	Surveying & Land Studies	15 th South East Asian Surveying Congress in Charles Darwin University, Australia, 13-18 th August 2019 <u>Paper Title:</u> <i>Liquefaction Potential Zone and Earthquake Hazard Zonation from a GIS Perspective in Fiji Islands: A Case Study of Viti Levu Island</i>	5,620.30
Dr Felix Pereira	Applied Physics	The International Symposium on Atmospheric and Oceanic Science (SAOS 2019), Kunming China at the Engineering Information Institute (ENGIII) China, 01 – 3 rd June 2019 <u>Paper Title:</u> <i>A Study of Climate Variability of Papua New Guinea</i>	6,118.00
TOTAL			14,866.40

ABSTRACTS
UNITECH SEMINAR SERIES
2019

Meeting the Ambient Particulate Matter Measurement Challenge

Dr. William Kojo Modey

Department of Applied Sciences

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Abstract

Human health end-point is exacerbated by ambient fine particulate matter, as evidenced by epidemiological studies. Ambient particulate matter (PM) pollution is a complex mixture of small particles and liquid droplets suspended in the atmosphere. Particles with diameter equal to, or less than 2.5 μm (PM_{2.5}) are either emitted directly from point and non-point sources, or formed in the atmosphere by secondary reactions involving primary emission precursors such as sulphur dioxide (SO₂), nitrogen oxides (collectively referred to as NO_x), volatile organic compounds (VOCs), and ammonia.

Therefore, on July 18th 1997, the United States Environmental Protection Agency (U.S. EPA) promulgated a 24-hour, and annual National Ambient Air Quality Standards (NAAQS) for PM_{2.5} at 65 $\mu\text{g}/\text{m}^3$, and 15 $\mu\text{g}/\text{m}^3$, respectively. On October 17th, 2006, EPA tightened the 24-hour standard from 65 $\mu\text{g}/\text{m}^3$ to 35 $\mu\text{g}/\text{m}^3$, but left the annual average untouched at 15 $\mu\text{g}/\text{m}^3$. On December 14th 2012, the EPA revised the annual average standard to 12 $\mu\text{g}/\text{m}^3$.

So, individual States were, or are to develop strategies to meet these standards. Apart from infrastructural challenges for States meeting these standards, there were also challenges in the accurate measurement of the concentration of fine particulate matter in the atmosphere.

Several measurements (including the Federal Reference Method itself) had failed to address key challenges in the accurate determination of these particulate materials, and so my discussion will address some of our successful samplers designed to address these challenges. Also, I will elaborate on further ideas on the horizon to accomplish even better outcomes.

Application of a Culture-educational Paradigm Shift Learning (CEPSL) Model

Dr. Mirzi L. Betasolo

Head, Department of Civil Engineering
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Abstract

The direction of the Papua New Guinea University of Technology is towards a student-centered learning pedagogy. Guided with a vision statement: The Papua New Guinea University of Technology will be the leading innovative, entrepreneurial, and student-centered university, contributing to a knowledge-based society in PNG and the South Pacific. The study aims to identify strategies of the university, academic staff leading to the pursuit of developing learner autonomy and independence. The research shows that the University provided infrastructure and training of their academic staff to deliver a student-centered environment. Academic Staff likewise have their strategies towards the delivery of their subjects. A case of material engineering and fluid mechanics class (of the Department of Civil Engineering) approaches called Cultural-Educational Paradigm Shifts Learning is shown in this presentation.

Interrogating the Rigor of the Five Point Format in Social Research: Implications for PNGUoT

Dr. Tindi Seje Nuru

Director, Teaching and Learning Methods Unit

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Abstract

Regardless of the nature of your research, an outline will help you to not only organize your thoughts, but also serve as the template for your entire paper. An outline of a research paper is a visual reminder to include all the pertinent details of your research into your essay or paper. It is essentially a skeletal version of the true paper and will guide you through the entire process.

Initially, dividing your essay, research or paper into various components (Introduction, Body, and Conclusion etc.) will help you to stay better organized and reduce the risk of Important Information being forgotten or unintentionally omitted. Furthermore, breaking the essay down into these parts will allow you to address specific parts individually and lessen the chances of feeling overwhelmed. The structure of your outline will be similar regardless of whether you are writing a scientific paper or something more general. Interestingly, the structure of a research outline is nearly identical to that of a research paper template. This presentation dissects the rigour in the **'5 Point Format'** associated with research in social sciences and its corresponding Implications for PNGUoT.

A Method to Assess Contextually Stream Flow Rating Curves and Sequences

Dr. Elena Carcano

Department of Civil Engineering

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Abstract

Rainfall runoff models are necessary instruments in hydrological environment especially when stream flow data are not directly observed. Models are generally introduced to give response to water resources requests such as; water management, and flood and drought forecasting. Models are divided into three different categories depending upon the difficulty of the context and application under debate. Physically based models are known to have parameters deeply related to the watershed's physical properties. Such models are extensively used with a high level of spatial detail required from the prediction. This is the case, for instance, of the prediction of inundation areas. However, when simpler prediction, such as only stream flow response is required, less complex models, such as conceptual ones, are brilliantly reliable. This presentation will discuss a prediction for small catchments characterized by intermittent and torrential flow regimes. The objective is to achieve a procedure which allows for the provision of a contextually duration curve and stream flow sequence. The procedure has been tested at some Italian catchments, located in the north western part of the country next to the French border.

Boundary Encroachment and the Cost it Incurs to the Papua New Guinea University of Technology

Mosese Tagicakibau

Department of Surveying and Lands Studies

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Abstract

Even though there is always a clear demarcation of boundary lines during, and upon the completion of any subdivision development, it is a must according to the law of the land that boundary pegs should be shown to the tenants, so they can have a clear idea on where and how they will build on their portion of the leased land. Most people just ignore this property rights and build structures which exceed the true boundary line and encroach into neighbouring property.

Here at UniTech, there is suspicion that some permanent building structures and fence lines constructed by our neighbours are well within the Unitech boundary line and need to be verified. This verification process is part of my MPhil project at the department of Surveying and Land Studies. The scientific steps in this verification process will include the following:

1. Satellite imagery that will be processed using Arcgis or Mapinfo software which will then be verified, measured and confirmed from,
2. A detailed pick up of corners of these structures by total station and plotted against the boundary of Unitech using Autocad.

Once the area of encroachment is confirmed and finalized, then assessment of the cost (valuation) of encroachment area will be determined by applying one of those methods of valuation. Encroachment on neighbouring property can prove to be extremely expensive to either owner and encroacher, and caution should be exercised well before any construction gets underway.

UniTech Digital Library: A Colossal Resource for Academic Engagement

Dr. Vayyavuru Sreenivasulu

University Librarian

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Abstract

Information resource is a paramount ingredient in our pursuit of academic excellence, as bibliographic literature serves as a good foundation in achieving such excellence. The Matheson Library at the University of Technology is endowed with over 160,000 collections of books and periodicals for academic engagement. The digital library component has over 100,000 e-Books on different subject areas, 25,000 e-journals, and other resources as well; all embodied in a spectrum of databases. This presentation will navigate paths to access these resources for academic enrichment, and climaxed with discussions on some strategic initiatives from the university library.

Geochemical Evidence of Slab Dehydration and Sediment Melting in the Mariana Volcanic Arc Basin System

Professor Kaul Gena

Pro-Vice Chancellor Administration, and Department of Mining Engineering

kaul.gena@pnguot.ac.pg

Abstract

Subduction zone magmatism is produced by melting and dehydration of the subducted slab introduced material into the mantle wedge and modifies its chemical and isotopic composition. As a consequence, island arc basalts differ significantly from mid-oceanic ridge basalt and ocean island basalts. In some arcs, the composition of the lavas is strongly influenced by sedimentary material introduced with the slab, in others, Magma composition is mainly affected by aqueous fluid released by the slab. In this study, I will present new geochemical data obtained from submarine volcanoes of Eifuku, Daikoku and Nikko from the Northern Seamount Province of Mariana Arc that indicates strong contribution of the elements La, Ba, Sm and Th from slab dehydration and sediment melt.

Bridge Infrastructure Network Maintenance Prioritization under Extreme User Cost Scenario

Primus V. Mtenga, PhD, PE, PHF

Professor, FAMU-FSU College of Engineering

Tallahassee, Florida, USA

(Visiting Professor, Civil Engineering, PNGUoT)

Abstract

In this presentation a practical approach for prioritization of bridge maintenance within a given bridge network is addressed. The maintenance prioritization is formulated as a multi-objective optimization problem where the simultaneous satisfaction of several conflicting objectives includes; minimization of maintenance costs, maximization of bridge condition, and minimization of traffic disruption and associated user costs. The prevalence of user cost during maintenance period is twofold; the first case refers to the period of dry season where normally the traffic flow is diverted to alternative routes usually resurfaced to regain traffic access. The second prevalence refers to the absence of alternative routes, which is often the case in the least developed countries; in this case the user cost referred to results from the waiting time, while the traffic flow is put on hold awaiting accomplishment of the maintenance activity. This presentation will address the second scenario of traffic closure in the absence of alternative diversion routes which in essence results in extreme user cost. Though the study presented is based on a travel corridor in Tanzania, it could very easily apply to PNG, where alternative routes are even more wanting.

Eroding Fabrics of Communal Land Ownership in Papua New Guinea

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Abstract

This work analyses the perceptions of 120 landowner-households of Nanadai Clan of Gaire Village in Central Province and Sek Clan of Madang Province concerning breaking apart of communal ownership of customary land in PNG. Previous researches have argues that there is lack of a clear distinction between individual and communal property rights in some parts of Papua New Guinea. The existing weak land administration system and mechanisms have contributed immensely towards tearing apart the bond and connections between clan members and the dismantling of communal land ownership in Papua New Guinea thus, compromising national land administration values and standards. Current practices reveal that customary land is held at the sub-clan, family and individual levels, while the major clans just bear ownership name-tag. The existing land legislation in Papua New Guinea recognises that ownership of customary land is vested in the clans, however, the realities on the ground from the findings of this research indicate otherwise. Therefore, this paper argues that communal land ownership in Papua New Guinea is slowly breaking apart causing disharmony and instability between major clans, sub-clans and families in PNG.

Keywords: Communal ownership, Clans, Land Administration System and Land Administration Standards.

Causality and Causal Explanation: A Scientific Inquiry in Social Research

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Abstract

As a Social Researcher, I have for the last one and half decades witnessed a disturbing lag in the existing body of literature for causal explanations. The majority seem to contradict and provide no clear-cut explanations about the relevancy of applying causal techniques to understand social patterns. Much as it is true that understanding social processes and patterns is in many ways more challenging than understanding the physical world, social researchers need to provide a justification to these complexities through scientific inquiry using causal techniques and interpretations. Many times social researchers concentrate on the simple linearity between cause and effect and yet its ability to explain reality is doubtful. This sounds to reason that our focus as social experts should be on what form of social interactions extend over time in the social world to establish the links between cause and effect. Again, how relevant is the available evidence to claim that social factor **X** causes a change in social factor **Y**? In other words, is social factor **Y** a function of social factor **X**? To establish a scientific conclusion and perhaps shed light on why things in the social world are the way they are, one must logically identify a competent **X** that can independently predict a change in **Y** through covariates. In light of this, social researchers can vividly offer logical explanations to various social processes which often seem to be beyond human description.

To this end, I'm thrilled to offer a scientific explanation concerning the various errors in reasoning within the social world and provide a distinction among various types of social explanations, articulate causal reasoning behind social processes, events and patterns in order to draw conclusions that are based on evidence.

Group Presentations by Researchers from the Bank of Papua New Guinea

Equilibrium Real Effective Exchange Rate (EREER) and Misalignments in Papua New Guinea

Meson Tumsok, Solomon Kasingu, Gail Sabok and Boniface Aipi

Abstract

The determination of EREER and misalignments for Papua New Guinea (PNG) is crucial as it would assist the Bank of Papua New Guinea to formulate appropriate exchange rate strategies that would enable price and macroeconomic stability and promote growth. We applied the single equation Behavioural Equilibrium Exchange Rate (BEER) method and respective PNG economic data for the period 1980Q1-2015Q4 and found real exchange rate to be slightly overvalued in 2015, but undervalued in 2016; both with the same magnitude. These results imply that in PNG real exchange rate is influenced mainly by key macroeconomic fundamentals.

Dynamic Impacts of Global Oil and Food Price Shocks on Inflation in Papua New Guinea

Eli Direye

Abstract

Studies find that large swings in global commodity prices have considerably affected inflation in most of the developing and emerging economies that are heavily dependent on imported energy and food. Since both oil and food prices have second-round effects, the relevance of their shocks on domestic inflation is an essential matter for monetary policy. It is in this spirit that this paper aims to examine the sensitivity of inflation in Papua New Guinea (PNG) to global oil and food price shocks. In this paper the Vector Autoregressive model was used to accomplish the objective of this research. The study finds that fluctuations in global oil and food prices exhibit both first-round and second-round effects on domestic inflation in PNG. The magnitude of the impact on domestic

inflation is proportional to the size of the weights of related domestic goods and services in the consumer basket. Sizeable impacts of these international price shocks on headline and core inflation are observed in the same year. Policy implications drawn from the empirical analysis suggest that exchange rate stability and active monetary policy are crucial for overall price stability in the economy amid large swings in international commodity prices. The underlying findings of the paper provide an impression that exchange rate stability, resistant monetary policy (especially during the times of large swings in commodity prices), and weak domestic demand in recent years, have contributed to the low inflation environment in PNG.

Cross-Border Interbank Contagion Risk Analysis for Papua New Guinea

Ludwig Aur Aba

Abstract

The banking and financial systems have recently developed into a more complicated network, with products and services more complex than before. This advancement in the banking and financial services is ably supported by technological transformation. A more complex financial system can conceal risks and will make it hard to detect potential contagion. In this study the network simulation analysis was employed in combination with stress testing and simple ordinary least squares (OLS) regressions to trace bank linkages and connectivity for systematic important countries (SIC), establish the stability of domestic banks, and estimate the size of foreign shocks particularly from Australia. The analysis showed that connectivity of banks is straight-forward, domestic banks are highly capitalized with limited impact of global commodity prices, interest rates, and credit shocks from Australia. The network analysis showed an expansion in the network between countries, which reflected increases in both claims and liabilities of PNG against its trading partner countries.

Money, Reserves and Transmission of Monetary Policy: Does Money Multiplier Hold in Pacific Island Countries – The Case of Papua New Guinea

Mark Ofoi

Abstract

This is the first study to systematically assess the significance of the standard money multiplier vis-à-vis bank credit transmission channel in the case of Pacific Island Economies, focusing on Papua New Guinea. Results suggest that the money multiplier does not hold, and that the transmission to bank credit appears weak. It seems that the ability of the central bank to make available loanable funds through its conduct of monetary policy may not enhance private sector credit. On the other hand, there appears to be a significant and positive association between bank deposits and credit; suggesting that bank deposits and credit are endogenous and demand-driven.

Estimating Excess Liquidity Demand Model for Papua New Guinea

Meson Tumsok

Abstract

In light of the persistent high level of excess liquidity in Papua New Guinea (PNG), estimation of its determinants is critical to understanding its sources and potential implication. This will enable policy makers to design appropriate policy measures to address this issue. This paper estimates a demand model for excess reserves in PNG. The approach is twofold: first, the paper establishes the determinants of excess liquidity; and second, it uses the factors to construct precautionary and involuntary components of excess reserves, which the distinction is significant to determine if excess reserves pose a threat to price stability.

Using monthly data from 2002 to 2016 and the General Methods of Moments (GMM) econometric model, the study established that excess reserve in PNG is mainly composed of involuntary excess reserves. The main involuntary excess reserve factors include private sector and government deposits, credit to private sector and government, investments in the domestic debt securities, and an increase in foreign exchange reserves.

Precautionary factors explained a smaller portion of excess reserves and include mainly the cash reserve requirement, currency risks, and volatility in the private sector deposits.

With these empirical finding, one can conclude that excess liquidity in PNG is a demand-induced phenomenon; that is, it is largely driven by the reduction in the demand for loans. This means that a sudden increase in aggregate demand in the economy could result in an increase in demand for loans, thereby inducing an increase in growth in lending to the private sector. This could in turn exert upward pressure on the price level in the economy. However, the impact channel from aggregate demand shock to private sector credit and to price level is yet to be tested for PNG, although this has been found to be true for other similar countries with the issue of excess liquidity in the banking system. As it is, higher excess liquidity poses threat to price stability and overall macroeconomic stability if aggregate demand conditions suddenly improve in the economy.

Foreign Exchange Shortage in Papua New Guinea: Is Devaluation an Option?

Rubayat Chowdhury & Jeffrey Yabom

Abstract

Papua New Guinea is in its sixth consecutive year of foreign exchange shortage since 2013. The shortage has resulted in import compression, weak domestic demand and lower government revenue. The country's central bank has been persistently infusing foreign exchange in the market but with little success in eliminating the growing backlog of import orders. Faster depletion of foreign reserves from intervention has also limited central bank's ability to further address the imbalance with its quantity-based measures. A practical policy suggestion in the face of balance of payments imbalance is an adjustment to the exchange rate. This paper examines if exchange rate depreciation can improve foreign exchange inflows through stimulating trade balance. Employing a vector autoregression model with different recursive identifications, we find that a sudden shock to the real exchange rate leads to a higher level of export and output with improved trade balance. While devaluation is slightly inflationary, the net impact on the economy is positive. The results indicate that exchange rate policy can effectively address the ongoing

imbalance in the foreign exchange market of Papua New Guinea.

Earthquake Hazard Micro Zonation In Fiji Islands: A Case Study of Viti Levu Island

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Abstract

Depending on magnitude, earthquake hazards can have collateral retort of devastations in collusion with the site-soil geology. Fiji – Tonga region accounts for about 70 percent of the world’s earthquakes with depths greater than 400 kilometers. Risk management through spatial planning is paramount for tectonism linked disasters in order to reduce the extent of fatality and economic cost. Humanity is at the ‘tipping point’ of self-destruction unless knowledge on disaster risk reduction is disseminated on time in the form of implementable solutions; such as using ArcGIS as a tool to provide worthwhile segmentation of disaster-prone zones to administrators. This presentation will cover assessment of the site-soil geology and earthquake hazard potentiality of Viti Levu Island using the GIS and remote sensing techniques. Site-soil geology, geomorphology, seismology and SRTM DEM data were the main sources of layers used to carry out analysis using the Saaty’s Analytical Hierarchical Process (AHP) and ArcGIS Multi-Criteria Analysis (MCA). The technology involves preparing and assessing several contributing factors (thematic layers) that are assigned with weightage and rankings, and finally normalizing the assigned weights and ranking. In the ArcGIS 10.5 spatial analyst tool, the raster calculator, and reclassify and weightage overlay tools were mainly employed in the study. The final output of EHZ indicates the ‘low’, ‘moderate’ and ‘high’ zones of potential earthquake disasters. The result provides a substantial readable guide for urban and regional spatial planners as well policy makers to formulate disaster reduction policies. Thus, informing civil societies, private societies and communities to become well-versed with adaptive strategies suitable to withstand and encounter earthquake hazards.

A Comparative Analysis of Customary Land Associations and Sustainability Issues in Papua New Guinea

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Abstract

This work analyses the perceptions of 129 customary landowner-households and stakeholders interviewed through stratified random sampling concerning the sustainability of customary land groups (incorporated Land Groups, Land Associations and Land Corporations) in Papua New Guinea (PNG). PNG follows a dual land tenure system where customary land tenure accounts for 86% while alienated land stands at 14% at present. The hypothesis tested reveals that Incorporated Land Groups are the most preferred land associations operating under the country's existing customary land administration policies and procedures. However, the complexity and modifications of the customary land tenure systems by landowners is creating issues amongst the landowners, State, and developers in PNG, with respect to benefit sharing, landownership, participation of landowners in the developments, financial support from financiers and other such land-related issues. The study suggests measures, including adherence to voluntary guidelines on the responsible governance of tenure land, fisheries, and forests, in the context of national food security (VGGT) guidelines, by which PNG and other countries having huge tracts of customary land can improve land tenure governance and achieve sustainable development on customary land.

Keywords: Customary land associations, Incorporated Land Groups, sustainability, Papua New Guinea.

Important Note:

This abstract mainly mirrors the abstract of the paper published by three co-authors Karigawa, L., Babarinde, J. A., and Holis, S. S. (2016), based on the original MPhil thesis by Karigawa, L. (2016). **Source: A Comparative Analysis of Customary Land Associations and Sustainability Issues in Papua New Guinea, *Land Tenure*, FAO, 2016.**

Appreciating the Complex and Dynamic Nature of Leadership and Governance in Higher Education Today: A Panacea for Systemic Excellence

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Abstract

The concept of leadership and governance has been a topical issue in the corporate world for many decades due to its ability to predict business competitiveness and success. Drawing from this experience, Higher Education from the recent past has been struggling to adopt similar strategic leadership and governance models in order to remain competitive, sound, and relevant to its clients just like in the corporate system. Unlike the corporate world, Higher Education today is dominated by complex systems whose dynamics are too volatile to be managed by an average administrator. The traditional model where senior professors assume leadership positions for the sake of their long stay in service is perhaps no longer practical in the light of the now myriad skills demanded in an effective university leader. In reality, Higher Education is at no time a closed system, and yet, employs rigid and closed minds whose ability to innovate, collaborate, learn, and challenge the status-quo are questionable. The cultural shifts, technological trends, revenue pressures, systemic flaws, insatiable students and staff demands, globalization and internationalization pressures, collaboration and partnerships all stage a slippery terrain which stifles leadership and governance in Higher Education today. University leaders are failing to realize that most of the leadership and governance issues are highly multifaceted and context-specific; replicating approaches and models which were suitable in the dark ages to address current challenges is unforgivable. Effort should be placed on answering questions such as; what is our context, how do we want it to be, what kind of leaders best suit our context, what unique features in our context best define us, and what implications does our context have on Higher Education? This paper synthesizes questions for policymakers, researchers and practitioners to consider. It closes with a call to action, encouraging academics and researchers to engage in action research that provides answers for immediate and future action.

A Review of Recent Research and Innovation Works in Electrical and Communication Engineering

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Abstract

The areas of research that the department has been active for sometime, or recently been exploring, include: reliability and security assessment of the electric power grid, the microwave emission based diagnosis of the new digital power substation (diagnosis similar to EEG and ECG diagnostics), telecommunication frequency spectrum and compromise, 5G (fifth generation) wireless systems, Drones, Artificial Intelligence (AI), Renewable Energy and women in engineering (the case for, the career hindrances and future challenges for women in engineering). Some of these areas will be reported at the seminar to a general audience. Amongst the facts that confront the modern, technical society is that electrical and electronic engineering permeates almost every facet of life, for better or for worse. Amongst the destructive aspects is the recent successful Drone attack on Saudi Arabian oil refinery. Out of these new technologies are two areas of research interest to us: 5G (fifth generation) wireless systems and AI (artificial intelligence). The 5G wireless systems set to operate at much higher frequencies than the present 4G wireless systems (health issues are involved) will be used in almost every single discipline we can think of in the world, from biomedical systems to electric power systems, from telecommunications to security system, and from clerical document transmission to high tech entertainment industry. Our research is related to one of the crucial parts of the 5G wireless systems: the smart antenna, and in our case driven by AI. In science fiction and amongst some researchers, AI may threaten to end the world.

The seminar will also seek to highlight why research is pertinent to good teaching and learning, how in the department we are trying to develop the culture where each PhD holder, both expatriate and national, seeks to supervise at least one PhD candidate, and how industry, science or design-based research can be encouraged administratively.

Mine Tailings Management at Wafi-Golpu

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Learn more about the Wafi Golpu Project and mine tailings management options that have been extensively investigated both for on land, and Deep-Sea Tailings Placement (DSTP). Find out just how many on land locations have been looked at and some of the challenges that were identified. Discover the natural sediment transport processes from the Markham, Busu, and other rivers; and why this contributes to the deep-water Markham Canyon (in the Western Huon Gulf) being a highly suitable location for DSTP. Weigh up the factors that the Wafi Golpu Joint Venture (WGJV) and their expert scientific teams evaluated in selecting DSTP as the preferred option, including considerations of long-term safety, engineering, environmental, social, cultural heritage and economics. Find out why DSTP in the Western Huon Gulf is not predicted to affect the coastal environment, fisheries, and human health.

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