PAPUA NEW GUINEA
UNIVERSITY OF TECHNOLOGY

Annual Report 2021

Grow World-Class Technocrats for the Real World

THE PAPUA NEW GUINEA
UNIVERSITY OF
TECHNOLOGY

Vision

To Grow World-Class Technocrats for the Real World

Mission

To grow world class technocrats through high quality and experiential teaching and research and ardent application of science, technology and innovation

Guiding Principles

- A sense of Community
- Commitment to Excellence
- Providing Service to Students
- Upholding Freedom of Thought, Enquiry and Expression
- Anticipation and Response
- Critical Assessment of our Performance
- Integrity
- Equity, Access and Participation

Priority Objectives 2020 - 2024

1. Strengthen and Embed Institutional Governance

1.1. Consolidate, harmonize and realign the PNG University of Technology Act and Higher Education Act with other subsidiary Acts and Regulations.

1.2. Streamline Council and Committees for effective leadership and performance

1.3. Develop and adopt a structured and coherent framework for the development, attraction, retention and succession of Council members, Council Secretariat and Senior Management.

1.4. Develop a performance management system based on balanced scorecard to operationalize, manage, monitor as well as track progress and accomplishments of the Strategic Plan.

2. Academic Excellence

2.1. Prepare scope of works and outsource to competent professionals to undertake comprehensive Higher Education Industry diagnostics and analysis. This should incorporate a supply/demand matrix to ascertain the gaps between what the PNG University of Technology is currently offering and the need and expectations of our 'real world' stakeholders.

2.2. Inculcate and model PNGUoT graduate attributes among all students.

2.3. All professional courses will be benchmarked or accredited to international or industry standards by 2024.

2.4. All subjects will have subject files and will be digitally available.

2.5. All faculty will attain PG Certificate in student-centered teaching.

3. Research Innovation and Training

3.1. Strategize to conduct research that meets industry and community demand.

3.2. Strengthen research on environment conservation and climate change.

3.3. Research Centers will expand and strengthen links with stakeholders for appropriate developments.

3.4. Post Graduate training will flourish by producing qualified professionals with Masters and PhD degrees while building a strong research culture within the University.

4. Organisational Effectiveness and Performance

4.1 Develop a strategic institutional leadership and talent framework to attract, retain and develop highly professional and competent administrative and academic staff.

4.2. Improve and expand human resource management, systems and processes.

4.3. Realign workforce planning, reward achievers in recognition of excellence with our real-world learning.

4.4. Develop continuing professional development (CPD) framework for our academic technocrats, incorporating a wide range of collaborative and individual activities, including working with

4.5. Consolidate and enhance existing security and safety programs by tailoring the program to each unique situation and campus setting such as:

- 4.5.1. Overall Campus Security.
- 4.5.2. Emergency Management.
- 4.5.3. Occupational Health and Safety Services.
- 4.5.4. Video Surveillance.
- 4.5.5. Perimeter Fence, Security & Street Lights.
- 4.5.6. Legal Matters.

4.6. Empower the University community through information technology that enables:

- 4.6.1. Effortless access to data, information and knowledge.
- 4.6.2. Effective and efficient use and deployment of information technology to automate administrative functions and systems.
- 4.6.3. Rapid and profound innovation in teaching, learning and research.
- 4.6.4. Seamless collaboration across communities and disciplines.

4.7. Expand network capacity to deliver online courses remotely.

5. Access, Externalization and Infrastructure/Utilities

5.1. Inspect all institutional properties and assets (staff accommodation, office, lecture halls, academic buildings, etc.) incorporating a comprehensive report of each asset (age of property, engineering and architectural soundness of structure, state or condition of property). Develop a comprehensive asset register and inventory of the assets including white goods (furniture and fittings). This asset register will become the repository for the asset data, which will provide the structure within which asset history is recorded and will include maintenance, modifications, upgrades, breakdowns, spares replacement as well as performance or productivity information.

5.2. Fully integrate asset register into the asset management and financial systems. This ensures that asset transactions are updated on a real-time basis and that data integrity is maintained between the asset register and the other systems.

5.3. Review cost-effectiveness, economies of scale and utilization of public utilities such as water, power(including stand-by generators and solar-powered lights, sewage system and garbage collection and disposal).

5.4. Develop “Business Case” for UNITECH Master Plan as a City within a City and in addition as one of the strategic objectives to supplement the medium to long term goal of financial self-sufficiency (See Strategic Domain 6).

5.5. Deliver Courses online to increase intake of students.

6. Financial Self Sufficiency

6.1. Consolidate internal controls, policies and procedures that protect the assets of the PNG University of Technology.

6.2. Create reliable financial reporting, promote compliance with laws and regulations and facilitate effective and efficient operations. It is important to form internal controls for:

6.2.1. Handling funds (received and expended).

6.2.2. Preparing appropriate and timely financial reporting.

6.2.3. Conducting and completing timely annual audits of financial statements and core processes.
Evaluating Bursary staff and programs.

6.2.4 Maintaining inventory records of real and personal property.

6.2.5 Implementing personnel and conflict of interest policies.

6.3. Leverage and grow effective business

6.3.1 Review and streamline the UNITECH Habitat to ensure it effectively performs its functions as a conservation and nature park, preservation and research into local animals and plant species and a Business Hub to sustain and maintain its operations.

6.3.2 Ensure effective marketing and implementation of the Business Plan of the PNG University of Technology's Master Plan – City within a City.

7. Industry Partnerships and Internationalization.

7.1. Interface with Stakeholders

7.1.1 Develop sustainable networks, partnerships, communication media, and activities between the PNG University of Technology and communities at local, national,regional and international levels. (Engagement activities between communities and higher education may be formal or informal. Example engagement initiatives include establishing relationships, collaboration initiatives, business ventures, co-sponsored meetings, conferences, sports events, research projects and many others.
Collaborate with James Cook University to develop a sound business case to assist indigenous landowners of Wafi/Golpu in business training, development and incubation as well as social, economic and environmental transition.

7.1.2 Expand and consolidate the PNG University of Technology alumni network.

7.2. Brand Marketing and Differentiation

7.1.3 Review the iconographic expressions of PNG University of Technology's identity and develop a unique brand to create a unique differentiation vis-à-vis other Universities providing similar programs and experiences in university education.

7.2.1 Public Relations Office will be active in promoting PNGUoT through all media.

7.3. Partnership with Overseas Universities

7.2.2 Conclude stage three of PNG University of Technology and James Cook University Twinning arrangement and ensure effective implementation and deployment.

7.3.1 International relations with multi- and bilateral partners will be strengthened. Collaborate with Board of UNITECH Development Corporation and its subsidiary,National Analytical and Testing

7.3.2 Laboratory Services (NATSL) to streamline and make them become "viable going concerns".

Contents

Vice Chancellor's Overview

The Strategic Plan (SP) 2020 – 2024 is in its 3 rd year of operation, and the objective has now been cascaded down to Tier III of the staffing levels for action. Each staff member had to deliver time-bound key performance indicators (KPIs), and respective HODs at the Tier II level monitored the performance of each staff.

The impact of COVID-19 affected the practical application of the strategic framework; however, much progress was made towards achieving major objectives. Performance assessment was not effectively rolled out due to a lack of HR capacity to operationalize action plans for each Department. This led to Council approval of the restructure at the Executive Management Level, where the Executive Director HR position was created to establish the function of effective performance management and appraisal system of each staff against progress towards achieving the objectives of the Strategic Plan.
The SP 2020-2024 has seven (7) domains (pillars). However, given the restructure mentioned above, the functions of the Registrar position is now focused on STUDENTS only. It was, therefore, necessary to create a new domain. Therefore, the Strategic Plan now has Domain No. 8 focusing on STUDENTS. The goal of Domain 8 is to establish a conducive study and living environment for all students here at Unitech. Some additional duties include providing accommodation services and information on employment opportunities for students.

Meanwhile, progress has undoubtedly been made in achieving key objectives under academic excellence. Critical requirements for advancing the engineering accreditation process have been met. The Chartered Practicing Accountants (CPA) PNG, have agreed to assist with accreditation of the Business Studies courses to industry standards. Architecture and Construction Management courses have already been benchmarked with the Australasian Architecture Schools Association (AASA) since 2008-2009, and now, in the process of accreditation.
The Agriculture Department has successfully affiliated with the Australian Institute of Agriculturalists, qualifying the courses to have been benchmarked to Australian Standards. Benchmarking of other courses will be a time-bound KPIs for the Departments in 2022.

The Executive Management decision to invest K800,000.00 into research is realizing the benefits. Unitech Postgraduate School has expanded to approximately 170 students with 15 PhDs increasing the research portfolio. Lecturers and Professors alike, while supervising students, have been publising papers in peer-reviewed journals on an average of 90 papers per year since 2020. This is a breakthrough for Unitech as very few papers have been published in past years. This has given rise to Unitech being the top University in PNG and in the top 20% of universities globally, as Uniranks Inc.
A positive impact of COVID-19 was the establishment of the Online Course Delivery Working Committee, which began preparations for hardware and softwares to deliver Unitech courses online to remote students starting 2022.

The funding position of the University has grown from strength to strength. The maintenance of the Unitech ailing infrastructure is progressing satisfactorily. Student dormitories have been given a facelift. Unitech has now been accorded another year of unqualified audits, bringing the total years to four (4). Financial reports indicate that Unitech has completed the financial year 2021 with an aggregated operating surplus of K10 million. The Executive Management will use parts of these funds to address the immediate demand for housing, student dormitory, and other infrastructure. Part of the fund was used to pay a one-off bonus to all University staff as a token of appreciation for successfully completing the academic year amidst the disruption due to COVID-19.
Student numbers continued to rise in 2021. Unitech had a total of nearly 3000 students on the main campus. The high number was realized with the assistance from the Government HELP program. Many students who could not afford school fees successfully secured the HELP loan and enrolled to study. All student accommodation space on campus has been fully occupied, and submissions have been made to the Government's PIP fund for more dormitories. The new Student Dining Hall construction has begun and will be completed and fully operational for Semester 1, 2023.

Associate Professor Ora Renagi OL PhD
Vice Chancellor

Organizational Structure

Members of the University Council

1. Dame Jean Kekedo, CSM, OStJ, OBE (Chancellor)
2. Mr Sam Koim, LLB, OBE (Pro-Chancellor)
3. Dr Ora Renagi, OL (Vice Chancellor)
4. Dr Gary Sali (Deputy Vice Chancellor)
5. Prof. Frank Griffin (Vice Chancellor UPNG)
6. Prof Tom Okpul (Professerial Rep)
7. Prof. Gariba Danbaro (Professerial Rep)
8. Dr Sujoy Kumar-Jana (Senior Academic Rep)
9 Mr Paul Isan (Non-Academice Rep)
10. Mr Michael Pearson (Ministerial Nominee)
11. Mr Wailyo Mapiso (Ministerial Nominee)
12. Mr John Byrne (Council Nominee)
13. Sir Nagora Bogan (Council Nominee)
14. Mrs Anna Wissink (Council Nominee)
15. Mr. Joselito Marcos (Council Nominee)
16. Dr. Augustine Moshi (Pro Vice Chancellor (Academic))
17. Pro. Kaul Gena (Pro Vice Chancellor (Administration))
18. Mr Elizah Kapma (SRS President
19. Ms Christy Epea (SRS Vice President)
20. Mrs Veronica Thomas (Registrar- In attendance)
21. Mr Diraviam Tharmaraj (Bursar- In attendance)
22. Mr Nethon Milifala (Executive Officer- In attendance)

PNG University of Technology Organizational Structure

The PNGUoT Organizational Structure of the University is derived from the PNG University of Technology Act, 1986, the University Statutes (by-laws) and the University Staff Establishment. The University Council membership is established under Section 9 of the University Act. The Council is made up of 28 members from various representations including members of Parliaments, the Higher Education Minister and Department, the universities and the civil society.
The Senior Executive Management, are identified as the Officers of the University under Section 25 of the University Act and the University Statutes No. 1/1995.

The Officers of the University are the;

1. Chancellor
2. Pro Chancellor
3. Vice Chancellor
4. Deputy Vice Chancellor
5. Pro Vice Chancellor-Academic
6. Pro Vice Chancellor-Planning and Development
7. Pro Vice Chancellor-Administration
8. Registrar
9. Bursar
10. University Librarian

Under the Officers of the University, there are 13 Academic Departments and about 20 non-Academic departments and sections and units that supports the officers of the University in implementing the University's purpose of establishment, including the University's visions and missions.The academic and non-academic departments, sections and units are derived from the University's Staff Establishment (established positions) as approved by the National Department of Personnel Management.

Attached is the illustration of the Organizational Structure.

Governance Structure

DEPARTMENT OF AGRICULTURE

The Department of Agriculture offers a science-based agriculture curriculum for undergraduate and postgraduate degree programs besides conducting basic and applied agriculture research and disseminating relevant information to the community. The Department's functions are guided by a vision: "A premier agricultural school providing high-class agricultural education to empower graduates to be innovative scientists, extensionists, entrepreneurs, and policy makers for sustainable agriculture and community development."

1. Academic Programs

The Department offers two undergraduate programs. The Bachelor of Science in Agriculture [B.Sc.(Ag)] is a full-time, on-campus, four-year study program, while the Bachelor of Agriculture and Rural Development (B.Ag. & R.D.) is a flexible and distance mode administered program. The Department also offers three postgraduate degree programs, the Master of Science in Agriculture [M.Sc.(Ag)], Master of Philosophy (M.Phil.), and Doctor of Philosophy (PhD). The M.Sc.(Ag) program combines coursework and research, while PhD and M.Phil. study programs are research only degrees. The total number of students enrolled in the B.Sc.(Ag) and BARD programs in 2021 were 183, with 146 and 37 students, respectively. In 2021, 27 graduated with B.Sc.(Ag.), while BARD students were scheduled to graduate in 2022. The postgraduate enrolments stand at 21 students, of which 3 are in PhD, 4 in M. Phil., and 14 in M.Sc. (Ag) programs. In 2021, 5 students graduated with Masters degrees (2 MPhils and 3 MScs).

The curricula of our programs are reviewed regularly to be able to deliver up-to-date and relevant information to students. As an ongoing exercise, the year four curriculum of B.Sc. (Ag.) was reviewed in the reporting year, and a refreshed curriculum was approved for implementation in 2022. The 2021 academic year concluded with completing the B.Sc.(Ag.) curriculum review.

2. Staffing and Infrastructure

The Department has 15 qualified academic staff, 11 with PhDs, and a wealth of teaching and research experience. Currently, one staff member is on study leave pursuing a PhD at the Queensland University of Technology, Australia. Staff members use a variety of Learning Management Systems for classroom and distance teaching modes, and the department offers a robust curriculum. All classrooms provide audio-visual aids for effective delivery of classroom teaching. Annual procurement of glassware, re-stocking of chemicals, and maintenance of lab equipment has ensured sufficient skill development in students through lab sessions. Recruitment to fill vacant positions for academic staff and a Farm Manager was initiated, and the Department hopes that successful candidates will take up appointments in 2022. Major facelift work started to meet the conditions for bench-marking of the agriculture programs, particularly on the undergraduate classrooms, laboratories, and staff offices. Refurbishment for the SPISARD offices started and was ongoing while the UASL laboratory was completed and launched in November 2021.

3. Research Activities

Research work in the Department is aimed at understanding biophysical, social and marketing issues constraining crop and animal production in PNG, sustainable animal and crop production at national and trans-national levels, and developing technologies for the processing crop production. Research is undertaken by final year students, postgraduate students, and academic staff. In 2021, 39 third and 29 fourth (final) year students undertook supervised research work for the subjects AG312/AG322 and AG403/AG404 special project I/II, respectively. These students worked on problems relating to crop protection, socio-economics, crop improvement, crop production/management, environmental management, and animal production. Research topics of the postgraduate students are highly relevant to meet the requirements of the stakeholders, and several of the postgraduates are jointly supervised by staff from research institutions and commodity industries e.g. National Agriculture Research Institute (NARI), New Britain Palm Oil Limited (NBPOL), Ramu-Agri Industries Ltd (RAIL), and Oil Palm Research Association (OPRA). Departmental staff members solely or in collaboration with postgraduate students have published 15 peer-reviewed journal articles in 2021; a few more are currently in the press. Dr. Ronnie Dotaona is the country leader on the ACIAR Sweet Potato Crop Protection project (in collaboration with Charles Sturt University, University of Southern Queensland, National Agriculture Research Institute [NARI], and the Fresh Produce Development Agency [FPDA]). Field trials for these projects have been set up in different sites in the Eastern Highlands and the Morobe Provinces, and data gathering is ongoing. Dr. Patrick Michael won a research grant from the PNG Science and Technology Secretariat (PNGSTS) to conduct research on the agronomic aspects of sweet potatoes in the Highlands region of PNG.

4. Industrial Relationship

The Department considers active academic and professional relationship to external institutions and industries as an important linkage that would facilitate benefits on knowledge, skills, and services. In 2021, the Department established new or maintained contacts with several national and international organizations including the Australian Institute of Agriculturalists (AIA), Australian Council of Deans of Agriculture (ACDA), Support for Rural Entrepreneurship, Investment and Trade in Papua New Guinea (STREIT), Outspan PNG (OLAM), ACIAR/CSIRO, GrowPNG Ltd, and Innovative Agro Industries (IAI). The Department's linkage to the external national organizations is also actively maintained through the engagement of our students who go on an annual 'Industrial Training' (in the new curriculum is called 'Work Integrated Learning - WIL'). Unfortunately, in 2021, we could not secure placements for students to undergo WIL due to issues associated with COVID-19.

5. Community Engagement

The South Pacific Institute for Sustainable Agriculture and Rural Development (SPISARD) is the conduit through which the Department channels its community outreach activities. SPISARD has negotiated and done baseline/situational assessments to strategically establish 'Resource Centers' around the country. Some of these locations include Hamara village, Oro Province; Kuli Gap, Jiwaka Province; Kapari village, Central Province, and Kendale area, Southern Highlands Province. The Department intends to extend its selection to have a fair coverage of the four regions of this country. The University essentially recognizes SPISARD's involvement in the community development plan through its strategic goal, from "Strategic Domain 7" in the "Strategic Plan 2020-2024, that, "SPISARD will be the platform to rollout agricultural development programs to the communities." As a commitment to this goal, the University gave SPISARD the sum of K100,000.00 in 2021.

DEPARTMENT OF APPLIED PHYSICS

It is the Department's wish that sufficient qualified Physics graduates are available to take up all the positions that require Physicist in all areas of the country's public, government and private sectors. Furthermore, having produced marketable graduates, the Department hopes to see some graduates take up careers both within the country and abroad.

The five-year strategic Plan (2016 – 2020) for the Department of Applied Physics at PNG University of Technology was developed as a result of the corporate strategic plan for the University. As a result, the vision, mission, and core values of the Department was strategically aligned with the vision, mission, and core values of the University's vision 2030 and the Government of Papua New Guinea's Vision 2050.

The Department's main objective is to produce graduates of international standards who can be marketable both locally and internationally. The Department wishes that the graduates are of high quality both ethically and morally, stocked with analytical skills to apply at any level, including entrepreneurship, to create wealth to alleviate poverty.

To meet the high standards of quality graduates, the department planned to develop human resources and upgrade existing facilities to the international level through institutional accreditation. Therefore, despite the size of the Department, the academic activities of the Department are expected to produce graduates of excellent output. Both the staff and students are expected to feel satisfied with the level of academic achievements in all areas of activity within the department and the University as a whole.

1. Staffing

Around 2015, when the strategic Plan was first introduced, we had only a few Lecturers with no Post Graduate programs. Therefore, we planned to recruit the most qualified Academic Staff and improve all other areas of academic excellence, such as Curriculum development, running PG programs, and many more.

In 2016 Department recruited 5 new Lecturers with all PhDs; a couple of them are Professors. From there on, we have trained and recruited Lecturers and Technical staff to fill up some of the vacancies. The list of Academic Staff is:

Head of the department:
Dr.Gabriel Anduwan

Professors:
Prof Manoj Mukhopadhyay

Associate Professors:
Dr. Felix Pereira
Dr. Dapsy Olatona

Senior Lecturers:
Dr. Mohamad Ali
Dr. Velusamy Senthilkumar

Lecturers:
Dr. David Kolkoma
Mr. Suame Ampana (Studying for PhD – Commonwealth scholarship)
Mr. Michael Gaoma (Studying for PhD,Unitech)
Mr. Kenson Tonny (Appointed this year)

List of Technical Officers
1.Mr. Kenny Michael (BSc in BSAP, Unitech)
Studying for MPhil
2. Mr. Mathew Waimbo (MSc & BSc in BSAP, Unitech)
3. Mr. William Piel (BSc in BSAP, Unitech)
4. Mr. Simeon Ifu (BSc in BSAP, Unitech)
5. Mr. Benson Dekson (Technical College graduate)
*Having theoretical background, these Technical Officers performed higher than other technical college graduates. They even help the academic staff by teaching laboratory classes and doing research.

2. Undergraduate Program

The PNG University of Technology (PNGUOT) has become a dual mode university as it embarks its academic programs to be offered through Open and Distance Learning as well as E-Learning, using a blended mode of study and delivery as well as traditional on-campus mode since its inception in 1993. PNGUOT will ensure that parity is maintained between students studying on-campus and external modes within the limits of resource constraints.
The Strategic Plan and the aspirations of the department of Applied Physics broad policies are to

• Raise the quality of teaching, learning and to facilitate the convergence of on-campus and off-campus teaching and learning modes by promoting and facilitating the use of relevant, interactive technologies and methodologies
• Maintain an active program of research into alternative modes of teaching and learning in higher education
• Publish and disseminate research results and ideas about external studies, online studies, and Flexible Learning in general
• Promote and participate in Consultancy through commercial activities by the department and impart knowledge to students who can go into entrepreneurship

With support from the central administration, the Applied Physics Department has all the required study materials and support services for all course programs in different modes of study that are of the highest pedagogical quality and effectiveness.

Applied Physics Department currently offers the following undergraduate programs:

• Bachelor of Science in Applied Physics with Electronics and Instrumentation
• Bachelor of Engineering in Biomedical Engineering

Based on registration figures in the last two academic school years (2020 and 2021), the potential of Applied Physics and Biomedical Engineering in the University's course programs have increased in annual growth in students' application to take Physics and Biomedical Engineering as their first choice for a university qualification.

The number of students who graduated in the Applied Physics programs are given below.

• The number of graduates per year is around twenty (20) to thirty (30) students. This number could increase if facilities are improved and more academic staff positions are created.
• Table of male and female students who graduated in the past few years

Year	No. Male students	No. of female students	Total graduated
2021	26	3	29
2020	25	3	28
2019	18	3	21
2018	18	5	23
2017	20	2	22
2016	16	7	23
2015	29	2	31
2014	21	2	23

3. Postgraduate Program

The Postgraduate programs in the department are.
• Master of Science and MPhil in Applied Physics (MSc & MPhil)
• Master of Technology in Exploration Geophysics (MTECH)
We have qualified staff in the department who are committed to effectively teaching our PG students in both programs.
We currently have five (5) Post Graduate Students for Applied Physics and Master of Technology in Exploration Geophysics with at one point 6 GAP Scholarship and one student from overseas who came and studied in the department under Queen Elizabeth Scholarship. In this year's last graduation nine (9) students graduated with PG qualifications in both MSc in Applied Physics and MTECH in Exploration Geophysics.

Year	No. of male students	No. of female students	Qualification
2021	1	0	PhD
2021	4	0	MSc
2021	4	0	MTECH
2020	4	1	MSc
2020	6	0	MTECH

4. Curriculum Development

a) We have reviewed our existing Applied Physics degree program into 4 subjects per semester up to the final year.

b) We have also reviewed and introduced the Biomedical Engineering program. We started with a few students for the first intake three years ago, and now they are into the third year. Next year these students will do their final year in the Biomedical Engineering program.

5. Research Publication

We have realized that most Qualified Lecturers leave when they find that they cannot do research. For that reason, We have set up a few research facilities in the department for different research areas. With our limited resources, the following research groups have been set up.

iv) Energy Group
Energy groups consist of different applications or other groups that can generate energy, such as geothermal, which is in the area of the Geophysics group. So we have Geothermal, hydro, solar, wind, and other applications that generate energy. SERI comes under this group which.

v) Electronics
Most Academic Staff are in the field of Electronics, and they do research and projects with both PG and final year undergraduate students. The Circuit board here shows the type of component used in this group.

vi) Environmental Physics Group
Staff members working in various groups also have environmental-related projects or research that fall into this group (Eg, Nuclear Physics studying radon within the city buildings). One of our Technical Staff is doing his PG studies under the environmental study group.

vii) Some of these groups published some papers in International Journals and hoped to do more. Most of these publications have been reported in the research report yearly.

6. Consultancy and Income Generation

The department has the potential to do a lot of consultancies using various skills and knowledge.

i) The Department is restricted by resources to do a more extensive scale project such as Exploration for an EL (Exploration License). We have written to some of the Provincial Governments to support us buy equipment which we can use to do the exploration in their Provinces.They have shown Positive responses and hope they will return to us.

ii) We also plan to build solar refrigerators through our skills but are still seeking financial support.

iii) When University wanted to contract CCTV cameras for security purposes on campus, we submitted our proposal to the University, and the University awarded the contract to the Department out of other bidders.As a result, the CCTV was installed on campus by the Department at some cost. The project costs about K75,000.00 mainly on the equipment.

iv) We just installed last week the latest equipment, the state-of-the-art equipment, the high purity Germanium P-Type Detector (HPGe), with its accessories and latest software available on the market. The equipment will be used to test samples from solid, liquid, and powder exposed to radioactive sources. It will also be useful for the country in terms of testing radiation levels in any food items, river sources, seawater, reefs, soil, rocks, and sediments in the areas that have mining activities. This equipment is the latest and enhances the Department's research drive and Postgraduate studies. Apart from the HPGe, there are also several radiation detectors to measure background environmental radiation.

i) Exploration Geophysics Group
- We have obtained Gravity data for all of PNG from France,
-Signed an MOA with MRA and to work collaboratively
-We purchased Geosoft software which can be used to process data
-PG students and staff are working in this group, making use of the data and MOA

ii) Condensed Matter/Nanotechnology Group
We have bought some equipment and chemicals to do research in this field. At the moment, one graduated with a master's degree. A PhD student and a Master's student are working with the group. We have published a few papers in international journals from this research group.

iii) Nuclear Physics Group
We have bought one of the best equipment (Gamma Ray Spectrometer by NaI(Tl)), which is being used for research now. Two of our staff members use the equipment to study for their PhD program. One used the equipment to find radiation given off by Mining Companies, and the other study for the radiation given off in towns and cities. Of the two, one passed away, and the other just graduated with PhD degree in June 2022. Two PG students graduated with Master's degree using this equipment.

Figure 1 shows the
a) Gamma Ray Spectrometer by NaI(Tl) and
b) Radon detector

It is the National Radiological Laboratory where all Government and private sectors using radioactive sources will send their materials for radiation exposure measurements at some cost.

Figure 1: Shows (a, b, c) High Purity Germanium Detector (HPGeD), which detects gamma rays in food, water, soil, seawater, reefs, rocks, and anything in the form of (liquid, solid, powder form) – with all its accessories.

7. Asset Management:

i) We have renovated two classrooms into the multimedia room with Air Conditioner installed. We hoped to convert all our classrooms into multimedia rooms with an internet connection.

ii) All -year laboratory equipment is bought new and students use it for all first-year classes.

iii) Roof Top Solar for Applied Physics department. The department of Applied Physics is given another project to build a Roof Top Solar project to power the Department of Applied Physics. All the design and preparations have been made but waiting for approval of Structural design by Structural Engineers and probably Building Board.

iv) We are now glad to announce that the National Dosimetry Laboratory which Government approved of Papua New Guinea is finally setup at Applied Physics department. The National Laboratory will monitor and regulate radio-active sources in the country. It will also be the research Centre for radiation baseline study and other research related to radiation in the country. About K1.2 million worth of equipment purchased by the International Atomic Energy Agency (IAEA). The latest state-of-the-art equip-ment was installed last week, 5th of July, 2022 at the Applied Physics department.

v) The EXTENSION of the Applied Physics Department at a cost of K1.5 million, which has 4 rooms funded by the National Institute of Standard and Industrial Technology (NISIT) worth about K700,000.00 plus another K1 million from PNG University of Technology, which will take place anytime this year. Below is the design of the building.

vi) We are also building a seismic station to measure the region's seismic activity. The recordings will help assess Risk Assessment around the Lae area and Markham Fault.

8. Future Plan

Out of so many things in mind, four things that needed to be done without delay. These are:

i) After completing the Extension of the Building, one room will be assigned “Industrial Training Center”. All industrial equipment will be installed, and the training of students and employees from the industry will be part of consultancies. This will also help our graduates get direct employment with industrial knowledge.

ii) Once the Industrial Training Center runs, the Department will apply for Accreditation with the Australian Institute of Physics (AIP). So, having qualified Lecturers, PG students, Research running smoothly, and Industrial equipment are set up, the BSAP program is set to go for Accreditation.

iii) When Dosimetry Laboratory is set up. We have Plan to do a lot of research throughout the country in the areas of radiation and safety. We will do a baseline study, and anyone using radioactive sources will be studied and build the knowledge bank in that field for the country. IAEA is looking upon us to be the leader in this field throughout the island nations throughout the pacific.

iv) Physics Education is very poor in the country. As a result, the first-year students we select are weak in Physics.Therefore, we have come up with the idea to start a new Master’s program in Physics Education.In this, we planned to get High School Teachers to come for a Master’s program, where Physics, Mathematics, and Electronics with one or two subjects in Education through TLMU. When completed, these graduates will go back and improve their teaching in those subjects we teach. This will significantly improve the Physics Education in all secondary Schools, Technical colleges, and anywhere our graduates are settled.

v) There may be new and exciting ideas, and things may come up which can be considered in the future. But, the items listed above can be implemented immediately for the department to be robust in its operation.

9. Conclusion:

In conclusion, strategically, the Department will reach 100% of the strategic Plan when all its objectives are reached. This includes the future Plan and a bit of perfection in its existing operation.
From our experience, we need strong, steady and focused leadership to keep pushing to meet our objectives and get the job done to maintain a strong department in this institution.

DEPARTMENT OF APPLIED SCIENCES

The Applied Sciences Department is unique because it offers two different and separate degree programs in one Department Building. This creates an opportunity for our students to form a lasting network of friends in two very different yet related fields of practice.

The Department is committed to training students at undergraduate and graduate levels of the highest quality. Our vision is “To become a quality department that produces intellectual manpower for Papua New Guinea’s development and sustenance”. Our mission is “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 on strengthening and enlightening the community.”

Our total intake is 60 students per year (30 students in each program). In 2021, 32 students in total graduated. Although, the Department’s employable rate is among the highest in the University, about 90% of our students find employment within six (6) months after completing their degree programs.

1. Academic Programs

Undergraduate degree programs offered are Bachelor of Science in Applied Chemistry and Bachelor of Science in Food Technology. Two completely different degree programs. This creates budgetary constraints because the curriculums are very different, so the needs for laboratory and practical classes and instruments and equipment do differ. In the midst of these constraints, the staff and the students from both programs work together harmoniously to achieve the vision and mission of the Department and the University as a whole.

Our courses are revised periodically to keep them current.

We have key stakeholders and an Industrial Advisory Committee who contribute to curriculum review and development. Last review was completed in the previous year with the primary purpose of aligning the Subject Learning Outcomes with the Program Outcomes, government expectations, the National Qualifications Framework,External standards, Professional accreditation requirements and the University’s vision, mission and graduate attributes.

It was also to bring the curriculum up to the international professional standards comparable to those of other Universities around the globe and to include the current and new developments in the broader area of the Food and Agriculture sector and the areas of Applied Chemistry.

The Department continues to mobilize its resources to impart high-quality throughput of its graduates. Hence, a strategy is in place to continue to adopt and use the best teaching practices to maintain quality. This has reflected well in the Academic Quality Assessment (AQAT) exercise by the University in which the Department of Applied Sciences has been in the top three of the thirteen (13) academic departments for the last three years.

(a) Bachelor of Science in Food Technology.

The Bachelor of Science in Food Technology is the only food science and food technology-related degree program in the South Pacific region apart from Australia and New Zealand. The program has been benchmarked with the Food Science and Technology program offered by the University of New South Wales (UNSW). The section has been addressing the recommendations given during the benchmarking. The food technology section has also been considering the accreditation requirements for professional bodies, especially the International Institute of Food Science and Technology (IFST).
Food Technology involves the application of science and engineering knowledge, beginning with the post-harvest handling of plant and animal-based raw materials through to the manufacturing, storage, and distribution of variety, convenient, quality, and nutritious food products.
It also includes the conversion of plant/animal-based raw materials into cosmetic, therapeutic, and medicinal products. The field of Food Technology includes:

- Food Engineering
- Food Chemistry
- Food Microbiology
- Food Nutrition
- Entrepreneurial Studies
- Food Processing
- Quality Assurance and Food Safety
- Food Regulatory Function.

(b) Bachelor of Science in Applied Chemistry

General Chemistry, Mathematics, Biology, Physics, and Language are studied in the first year. Second Year Applied Chemistry majorly emphasizes further chemistry; Analytical, Inorganic, Organic, and Physical Chemistry are emphasized. Students also take courses in Mathematics, Language, and Applications of Computing in Applied Sciences. There is a greater specialization in the final two years with an emphasis on analytical methods and techniques, requiring students to spend much time in well-equipped laboratories and instrumental laboratories acquiring skills essential for experimental science. In the fourth year, the course includes Advance Chemistry topics in Analytical and Environmental Chemistry.
The Applied Chemistry section has been considering the accreditation requirements by professional bodies, especially that of the Royal Society of Chemistry.

(c) Postgraduate programs offered by the Department

The Department offers a Master's of Philosophy in Applied Chemistry and Master's of Philosophy in Food Technology and Doctor of Philosophy in Doctor of Philosophy in Applied Chemistry and Food Technology respectively. In 2021, we graduated one female PhD (Applied Chemistry) and 1 MPhil (Food Technology). Currently, we have three national staff for PhD studies, 2 in the country and 1 in Australia. We have seven (6) MPhil students, which includes one national staff member.
The Department encourages high-quality need-based or impact research at undergraduate and postgraduate levels and continues to produce around 2 publications per year. In addition, the Department, in line with the University and the national vision, strives to deliver high-quality graduates at higher degree level as well.

2. Staffing and infrastructure

Staffing includes both the academic and the technical staff as well as the support staff. Most of the current teaching staff have postgraduate qualifications at Master's and PhD levels from universities abroad. Some of them also have industrial experiences both within the country and overseas. The Food Technology program has 5 teaching staff, and the Applied Chemistry program has 5 lecturers. Some of our MPhil students also assist academics as teaching assistants and tutors. In addition, we have about 4 part-time tutors that assist with laboratory/practical classes and marking.
The Department has 2 chemical laboratories, a microbiology lab, a chemical instrumentation lab, a food analysis laboratory, 2 lecture rooms, and offices for academic and technical staff. Next to the main building is the Food Processing Pilot Plant, which houses the necessary instruments and equipment that is used for food engineering and processing as well as product development practical classes and related research.
National Food Testing and Monitoring Centre (NFTMC) was established in partnership with the National Fisheries Authority and is attached to the Department and will become of great benefit to the students and staff of the Department once it becomes 100% operational after accreditation. It will elevate the research capacity of the staff and students and equip them with the knowledge and expertise on some of the newest technologies in analytical instrumentation and equipment as well as high quality skills and experience in microbiology, food analysis and a range of chemical analyses.

3. Partnership, collaborations, and consultation

The Department is well connected to government departments, food, agriculture, chemical, and mining industries through research, short courses, and consultancies. This partnership has helped the Department and University as a whole in many ways. For example, it has reflected well in our graduates' employment status and in securing industrial training attachments for our third-year students. The establishment of the National Food Testing and Monitoring Centre (NFTMC) in partnership with the National Fisheries Authority and this partnership is ongoing.There is ongoing partnership between food industries and other agro-industries as well other statutory organizations and community groups on matters related to food and agro-commodities or chemistry related areas in which our staff and students are engaged.

(a) Collaborating partners in research in 2021
David Timi is a collaborating partner in a PIURN project between Uni of New Caledonia, James Cook Uni and PNG Unitech on biochemical examination of Leaves of Genus species Xenthostemon as a good source of biologically active volatile oil. Dr. Bathula collaborates with other Pacific Island Universities on the assessment and development of national water quality standards in Vanuatu.

(b) Short Certificate Courses offered in the Department
Food Safety Course:
Science & Application Training:
Farm to the Fork
This is a popular short course offered to food and allied industries. The course has been running for five years now, and has successfully linked players in the food and allied industries, regulatory bodies such as NAQIA, NFA, Health Department, and ICCC, and academic institutions such as universities and secondary schools.
The short course runs for 3-5 days per level, beginning at the level I, all the way to level III, and is intended for personnel in the food and allied industries, food service establishments, regulatory bodies, and education agencies.This short course is run every semester break with between 10-20 participants attending the different levels each time.

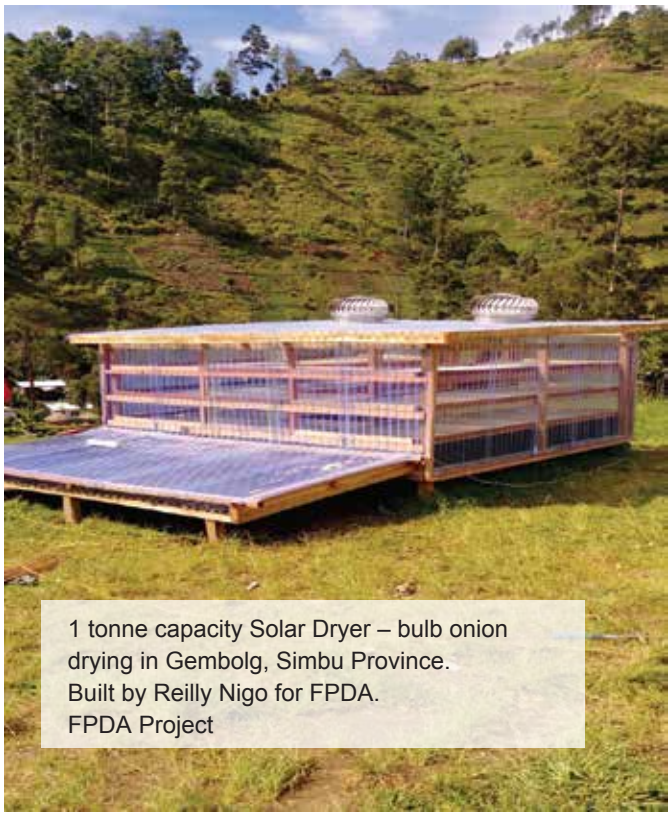
4. Consultation services

The Department continues to offer consultation services primarily in the laboratory analyses in microbiology, food analyses, and chemical analysis. The has a good number of industry partners who have consistently used our services over the years.
Once the NFTMC is fully accredited and appropriately staffed, we would be expecting testing for organic contaminants, such as persistent organic pollutants (POPs), polycyclic aromatic hydrocarbons (PAH), dioxins and dioxin-like compounds, polychlorinated biphenyls (PCBs) and pesticide residues, and testing for metal contaminants in water, food/feeds and biological materials.

5. Research, Innovation, and entrepreneurship

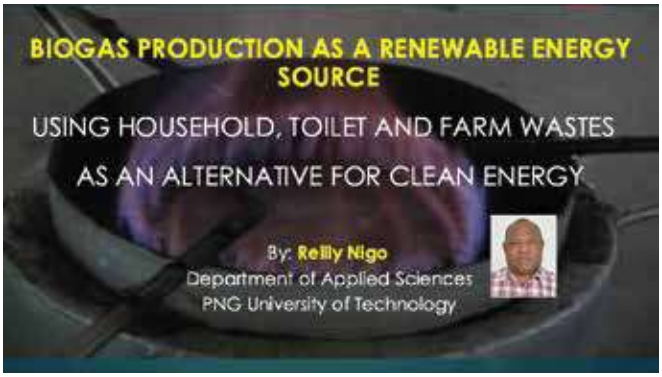
The Department offers Master's of Philosophy and Doctor of Philosophy in Applied Chemistry and Food Technology programs. Recently we have had a lot of interest in our MPhil and PhD programs from the food and Agro-industries as well as the environmental and the medicinal chemistry areas. Currently (2021), we have 6 MPhil students on campus, one of which is a national staff member. We have 3 PhD students, all national lecturers, 2 at Unitech and 1 at UQ, Australia. We also have a member of our staff doing Masters by course work in India. We have 4 more MPhil students to join next year.
The Department encourages high-quality need-based or impact research at undergraduate and postgraduate levels and continues to produce around 2 publications per year. The Department, in keeping with the University and the national vision, strives to deliver high-quality graduates at higher degree levels as well.

The academic staff members engage in research and consultation activities related to their specific areas of specializations, and interested prospective students are encouraged to contact the Department for details. Apart from teaching and consultancy, research, Innovation and entrepreneurship is also priority area of interest. Joint industry-department research activities have seen some adaptable innovative solutions to address problems in the industry and community.
Below are two current impact research projects led by Mr. Reilly Nigo, the head of the Food Technology section,
oth are at the implementation stage. These projects are addressing the real-life problems affecting the everyday Papua New Guineans and helping to raise the standard of living of our people; this is what we encourage our students to do.



1 tonne capacity Solar Dryer – bulb onion drying in Gembolg, Simbu Province.
Built by Reilly Nigo for FPDA.
FPDA Project

Some farmers and cooperatives for vanilla, cocoa, and coffee are already using these solar dryers and seeing the benefits, and many others throughout PNG have asked for it.



DEPARTMENT OF ARCHITECTURE AND CONSTRUCTION MANAGEMENT

Introduction

While embracing sweeping regional and global changes in education delivery models, triggering realignments, forging partnerships among global professional bodies and competency attributes of our graduates. The Architecture and Construction Management Educational delivery in the PNG has ventured into developing a 'brand of graduates' that have the savvy and ability to customize the application of technology transfer to the masses in the remote and rural sector. The introduction of courses and curricula that specifically addresses Multidisciplinary Professional Engagement is project design, development, and delivery into the Rural Sector of PNG as an integral part of the new Master's degree curriculum.
The Department has laid down the foundation since1997/1998 for external benchmarking. This is a continuous process , will continue over many years.
Nevertheless, this must meaningfully tie in with the ability to deliver to the needs and demands of the PNG context. This has compellingly demanded rethinking and resetting architecture and construction management education in PNG to enable graduate relevance, competency and fitness at optimal competitive placing, in-country and abroad. The rethinking also highlights the uniqueness of contextual Architecture and Construction management offering in the Australasian Region.
This whole process will take time, but every small step is now being taken, commencing 2020 to produce relevant and competent graduates by 2024.

1. The re-VISIONING and re-MISSIONING

The above Rethinking/Re-scoping is adapted as a continuous process because of the shifting challenges and unremitting changes that are being made in the construction industry and the participation of international presence in the construction and development phases. There is also the need for curriculum and staffing capability to sync with the inevitable dynamics of technological advance and input in tandem with Industry-I4 and Education-E4 derivatives and, leading to Industry-I5 and Eduction-E5 phasing with AI and IOT interphases toward total digitalized production and delivery makes shifting-changes often uncomfortable and demanding. Synchronized phasing is demanding; nonetheless, one is careful to not negate what has been gained but to add value to what is current and that which will enable greater meaning and purpose to be compatible in the international interactive education as an institution and the professional compatibility of our graduates. This is done whilst embracing the need to enable quality manpower at credible standing, compatibility, accreditation, membership, and collaborative partnerships with other Australasian Schools and other partner affiliations such as CAA, AIA, and UIA.

2. Teaching and Curriculum

After a major 'surgical refitting' in 2018 and redesigning to customize that ideal graduate; for an optimum marketability outcome. The traditional five-year undergraduate delivery is now being phased out by 2023. The new 3+2 in the architecture program and 4+1 in the Construction Management program were phased in in 2020 and have progressed with excellent performance outcomes in all the years. The 3-year program terminates in 2022, while the 4-year Construction Management program terminates in 2023. The performance expectation has been exceptional at 65% on average. The cross-over continuity into the Master Programs is planned for 2023 subject to formal approval in the university process. The 5-year retrofit with undergraduate and postgraduate attainment within the five years by the 3+2 and 4+1 delivery within the benchmarked (PNGNQF and Australian AQF for accreditation purposes) quality assurance frameworks is a big plus but awaits testing in the industry in the next few years for PNG. Nevertheless, it has been successful in Australia and New Zealand.

3. Graduate Feedback

Graduate feedback and faculty membership in the professional boards and committees (PNGIA, PNGIOB, & PNGBOA) consistently evaluate graduate performance and their (CPD) assessment at the workplace. The Departmental presence in the Industry Boards and Industry Council enables continuous discussion and dialog in improving and developing the ideal and industry-ready graduate in the full 5-year education process. The dynamics of technological innovation is giving boosted propulsion in production, interacting professional competence, and exchange. This has changed the traditional makeup of project design-development and delivery. The 'computer-chip' has now prompted prominence for portability/mobility and smart professional conduct/output, and with ethical awareness of socio-cultural, and environmentally conscious and within economic flexibility and feasibility. This, is the epitome of the NEXT GRADUATE, anticipated out of the new programs. We are a small school but have the heart to deliver with tact and professional competence.

4. Final Year Project benchmarked to Industry Expectation

Final year research projects are designed to address fundamental issues experienced in the PNG Building and now the greater Construction Industry and the creative impulse in developing/finding solutions for these issues. A research report is presented as an assessment by all students. The architecture students take this report further into a capstone 'Design Thesis' production in several development scenarios – both urban and rural. The Building and Construction Management students do real project development simulation and development outcomes. The master's programs are designed to elevate graduate expectations to meaningfully dovetail-in the workforce ready to be work-ready but equipped with the tools of the trade on the job.

5. Research and Publication

Research and Development had little activity in the Department in 2020/2021 due to heavy load-sharing and inadequate (42%) staffing level. Several product research work commenced in 2017/18, but this did not continue due to time and poor funding. Much scope was given to the undergraduate final year projects to enable quality graduates. This has provided much satisfaction with the 100% employment by all the graduates since 2018.

6. Consultancy

There is vast potential and possibility in the Department with industry competent, licensed, and registered capability in the faculty membership. However, there was very little activity in consultancy work in 2020/2021 compared to previous years.

7. Community/Industry Engagement

Community engagement is conducted through community design projects, and final year capstone projects are carried out in major assignments every semester. Staff were engaged in a number of industry committees and Boards. (National Polytechnic Council, NRI Council, PNGIA, PNGIOB, BOAPNG, and UNITECH community groups/organizations.

8. Staffing Quality/Qualification Progress

Staffing has been a significant challenge for several years. The Department is making the effort to have staff on the deck each academic year. A staff has completed his PhD studies at Queensland University of Technology (QUT) in 2021, while another has commenced his PhD studies at QUT. One has completed his Master's studies at UNRE. New staffing is highly anticipated in 2023.

DEPARTMENT OF BUSINESS STUDIES

The Department of Business Studies (DBS) is the largest Department of the thirteen academic Departments at the university, with more than 700 undergraduate and postgraduate enrolments each year. It is a multidisciplinary Department with a proven track record of producing national, Pacific-Region, and international leaders. Our alumni have led PNG's industrial and governmental sectors for decades.

1. Vision Statement

Our vision is to develop the Department of Business Studies into the most innovative, entrepreneurial, and student-centered Department of the PNGUoT in the South Pacific region. Our mission is to pursue national and international excellence in teaching, learning, research, and community engagement in Accounting, Applied Economics, Entrepreneurship, Information Technology, and Management.

2. Programs

Department of Business Studies offers four main undergraduate programs in Accounting, Applied Economics, Business Management, and Information Technology, giving students an option to apply directly to each stream. The streams provide our students the ease to build bridges between knowledge, skill, and practice. It also offers postgraduate programs, including a PhD in Information Technology, Applied Economics, Finance and Banking, and a Master's of Philosophy in Information Technology,
Economics, Finance, and Banking. It also offers a Master's in Business Administration (MBA) and an Executive Masters in Business Administration (EMBA) program.

3. Recent Establishment of National Entrepreneurship and SME Innovation and Incubation Centre.

The Department has recently established a National Entrepreneurship and SME Innovation and Incubation Centre. The focus of the Centre is to capture the GovPNG vision and goals 2030 to increase more SMEs in Papua New Guinea. It looks at four main objectives; SME incubation, Innovation and training, Mentoring and Business Model development and short course training. The Centre is in its initial stages of development
and was expected to roll out its programs by early 2021.
However, this has not eventuated due to the incumbent not performing to expectation. Because of this, DBS is expected to fill the position of Centre Director with a full-time staff in the foreseeable future.
The Department also has a research centre for big-data analytics and intelligent systems. In addition, it is building a PNG–China Centre of Business Studies and a PNG-Australia Centre of Governance and Policy Development. The Centre is headed by Professor Zhaohao Sun (PhD) who has published extensively, improving the Department of business studies research profile.

4. Future Programs Under Development

The Department of Business Studies is developing other comprehensive postgraduate programs, including an Honours in Applied Economics and Postgraduate diplomas and Master's and PhD programs in Accounting and Management. The programs are currently aiming to drive various aspects of national strategic visions and development efforts of the University and the Government of Papua New Guinea, as well as regional and global competitiveness, innovation, and entrepreneurship in an increasingly complex business environment.

5. Professional Academic Staff

The faculty is staffed by a dedicated, nationally and internationally recognized team of academics whose teaching is innovation and entrepreneurship driven and supported by their active involvement in relevant industries and professional associations. All our academic staff have qualifications from reputable Universities in Australia, USA, UK, China, and other universities worldwide.
Following the university's accreditation requirements, most of our staff have a minimum of a master's qualification or above. Our aim as a Department is to see young national academic staff graduating with PhDs in their respective specialties to lead in providing academic leadership. So far, we have one national staff who graduated with PhD in Economics (2020) and two master's degrees from reputable universities in Australia.

6. Research and Consultancies

The faculty pursues excellence in teaching/learning, research, consultancy, and community service supported by innovative and interactive blended technologies. Academic staff have an established research record with a commitment to conducting competitive research with a national and international reputation. For the past sixteen years, the Department has conducted various short-term tailored training and consultancies for both the private and public sectors. This outreach partnership is continuing under the new brand name,
"The National Entrepreneurship and SME Incubation and Innovation Centre".

7. Student Learning facilities

The Department has been committed to providing our students with excellent education opportunities using state-of-the-art ICT technology and equipment. Currently, the Department is transforming and improving its infrastructures to meet the expectations of providing lectures online. Due to the COVID-19 pandemic, all our programs are being delivered through online modes, using Google Classroom and Moodle. This will be a new approach going forward.

8. Satellite Campus Accounting Diploma Program

This is another recent milestone achievement in the establishment of a satellite campus at Simbu Province. The Centre was established in 2018 with her first intake of diploma program in Accounting. This was the first of its kind for the Department to expand out of Lae. Its inaugural graduation of her pioneer students was conducted at the end of the year. The Department highly appreciates and thanks the committed staff for the successful development of course modules, on-site lectures, and completion of the program.

9. Entrepreneurship Training and Partnership with Global Handong University, South Korea

The Department has embarked on building international partnerships since it was first established. It has recently partnered with Global Handong University to train more than forty Papua New Guinean SME owners on entrepreneurship mindset and design thinking. The participants highly appreciated the training, and the Department acknowledged and thanked the Global Handong University for this great initiative. The Department invites all stakeholders to join us in building our nation through human resource development and creating more entrepreneurial mindsets.

10. Research and Publication

DBS has a colorful research and publications culture through Professor Sun, Professor Geetha, and Professor Thomas. However, there is a lot of room for improvement, especially for national academic staff.

DEPARTMENT OF CIVIL ENGINEERING

The Department of Civil Engineering offers a four-year undergraduate degree (UG) program, a two-year postgraduate program either by coursework or research, and PhD program within the campus. The UG program in the year 2021 was its third year of the accreditation process to the Washington Accord accrediting body through Engineers Australia. The postgraduate programs offered by course work in the Department are Master of Engineering in Civil and Master of Science in Solid Waste & Resource Management. The Department contains well-equipped laboratories and is modernizing with the latest equipment and software. The Department had 8 -time academic staff (2 with PhDs, 2 doing part-time PhD, 2 with Master's Degree and 2 doing MPhil) and 5 part-time faculty members. In addition, there were 2 part-time PhD, 4 MSc in Solid Waste & Resource Management Programs, 2 MEng (Civil Engineering) Program and 190 (48 year 1, 52 year 2, 53 year 3, 37 year 4) undergraduate students.

1. Achievements.

(i) The Rone Lane Learning Centre.

Markham Culverts Ltd is the leading manufacturer and supplier to the Civil Engineering Community in Papua New Guinea constructed one storey building at the cost of K150,000.00 in the Civil Engineering Department and donated it to the Department on the 25th of November 2021. The building was equipped with air conditioning and tables and is readily available for students to use in 2022.

(ii) International Online Guest Lecture Series

In order to extend students' exposure to recent developments in Civil Engineering, the HoD Dr. R. Subramanyam has initiated an International online guest lecture series, commencing in 2021, with the approval of the School of Engineering. The following lectures were organized.

1. “Artificial Intelligence in Civil Engineering” by Dr. Piyush Samui, Department of Civil Engineering,NIT Patna, India, on 29th September 2021, 3 to 4 PM.

2. “Waste Biorefineries for Biofuels and Biochemicals” by Dr. S. Venkata Mohan, CSIR-Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad, India,on 4th October 2021, 3 to 4 PM.

(iii) International Excellence Awards

The Civil Engineering Students won International Excellence Awards from ACIGS (Australasia Chapter of the International Geosynthetic Society).

1. The first awardee was Ms. Annagrace Anis, a 3rd-year female student in 2021. Her research project titled "Use of Geobag for Unitech's Sewage System" and was supervised by Dr. Mirzi Betasolo.

2. The second awardee was Mr. Moses Boko with research titled: "Geomaterials to reclaim the shore of Busamang Salamaua LLG, Morobe Province. Research is AUD $3,000 (Mr Boko has received the first tranche of PGK 3,597).

(iv) Indexed Journal Publications by the Department

1. Subramanyam, R. Solid waste management in Lae city, Papua New Guinea. Journal of Solid Waste Technology and Management, 47(2), 371-382, 2021.

2. Willie Doaemo, Sahil Dhiman, Alexander Borovskis, Wenlan Zhang, Sumedha Bhat, Srishti Jaipuria, & Mirzi Betasolo. Assessment of municipal solid waste management system in Lae City, Papua New Guinea in the context of sustainable development. Environment, Development and Sustainability, 23, 18509–18539, 2021.

(v) Developments of Labs

The Department has received the large bulk of its laboratory equipment for all years. Some is in the process of being commissioned.

In addition, a new boat for teaching and research was launched on 30th November 2021 and named after the wife of outgoing PVC Academic, Dr. Augustine Moshi.

(vi) International Collaboration with ILO-STREIT PNG

The training is intended to provide Capacity Development of ILO-STREIT (International Labour Organization - Support To Rural Entrepreneurship, Investment, and Trade), PNG stakeholders amounting to PGK956,945, which is in line with the vision to grow world-class technocrats for the real world.

Research Grant

Dr. Revanuru Subramanyam, HoD of Civil Engineering Department’s MPhil student Ms. Esther Tuweyo has been awarded (PGK30,000) KITE Grant funded by the Department of Higher Education, Research and Technology, Papua New Guinea, in the year 2021. Her research topic istitled “Generation of methane through co-digestion of coffee pulp and poultry manure”.

(vii) Staff Qualifications

1. Ms Grace Wantepe submitted her MPhil thesis titled:
Health Monitoring of Steel Girder Bridge:
A Case Study of Butibam and Bumbu Bridge of Lae City to the PG Dean’s office.

2. Mr Christopher Kobal and Mr Murray Konzang are in their first year of PhD Studies.

(viii) Consultancy works

The technical staff in the Department are highly experienced in fieldwork and laboratory work. For example, the structures laboratory earned K26, 774/- in the year 2021 by providing testing facilities to UN CONSTRUCTION, DAI NIPPON CONSTRUCTION, CRCG, ALVA ENGINEERING, and BARLOW INDUSTRIES LTD companies. Similarly, other labs also earned a substantial amount.

(ix) Field visits

In order to give real-world experience to the students, the Department has arranged field trips for Civil Engineering students to Nadzab airport in October, 2021.

DEPARTMENT OF COMMUNICATION AND DEVELOPMENT STUDIES

After a challenging start amidst the prevailing threats from issues related to COVID-19, the CDS Department, unlike in 2020, ended its academic programs well in 2021, even without my presence (as I was on sick leave due to COVID-19 infection in the second half of semester two).
All the important administrative and support services functioned to the expectations of the University under the dedicated leadership of the Deputy Head of Department, Mrs Lucy Maino, and ably supported by the senior staff in the Department including Prof Eric Gilder, Dr Rachel Aisoli-Orake, Mr Joshua Kuri and others.
Early in 2021, the Department lost two of its senior and long-serving members of staff, one passed on 21 February (late Mary Aisi), and the other was forced to resign due to severe health conditions in April (Ngawae Mitio, who passed away only 12 months later on 9 April, 2022).

1. Teaching and Learning Activities of the Department

The teaching and learning activities of the Department continued under New Normal COVID-19 protocols right from the beginning of the first semester and throughout the second semester of the year. Online teaching became the standard mode of preparation and delivery of lessons, with Google Classroom being the main platform used by the teaching staff for both undergraduate and postgraduate programs.. However, there were sporadic periods of contact with small-group classes and seminars arranged by individual staff.

Progressive assessment done by the Department toward the end of semester one on the New Normal protocol-teaching arrangements indicated mixed reactions and feedback from staff and students. Therefore, ongoing monitoring and evaluation were done by the Department's COVID-19 overseer (Dr Orake) to facilitate the smooth flow of its teaching and learning activities under these restrictions.
Coupled with students' protests and demands, the Department responded by allowing contact classes to resume weekly during the second semester of 2021, in compliance with the New Normal protocols.Teaching in the Department's Postgraduate program was minimally affected due to small classes. Due to capacity constraints pertaining to supervision(only two PhD-holding staff), the Department had opted to reduce its number of intakes, mainly for the MCS and M.Phil. programs. Because of this shortage of qualified staff, the Department took on a vigorous drive to employ three senior staff in 2021 to fill that gap. So far, one appointment has been made (Associate Professor Dr Steven Winduo), and two are shortlisted and awaiting interviews (Senior Lecturer and Professorial positions).
These new appointments will enable the Department toincrease its intakes for both the Master's and PhD study programs in 2023 and onwards.
The Department continued its external teaching activities at the SUSU campus by completing and delivering course modules for the second-year students in the Diploma program. The first graduation occurred in December 2020 when ten (10) pioneer students received their Diploma in Communication and Development Studies.
The graduation for the second cohort (2021) was deferred due to COVID-19 restrictions. Nevertheless, they eventually graduated with the main campus students at the Taraka campus in June this year (2022). That was the first time students from the SUSU campus graduated at the main campus.Once again, the CDS Department was chosen to join the other three PNGUoT academic departments to pilot the Online Education Programme in 2022 for Non-School Leavers across the country. : Staff teaching the first year, semester one subjects started producing their respective course modules towards the second half of semester two, 2021. (The OLEP commenced on 25 May 2022 and is now enrolling students for 2023.)
The CDS Department also completed and submitted its final Subject Specifications (SS) to the UGCC for the fourth-year subjects under the restructured four subjects per semester arrangements. This year (2022) saw the commencement of the full undergraduate degree program from years one to four.

2. Graduate Feedback from Industry Partners and Stakeholders

Due to various reasons, including the restrictions imposed nationwide on public gatherings caused by COVID-19, there were no meetings for the CDS Industry Advisory Committee in 2021. However, the Department plans to have one in 2022 if the restrictions are lifted.Former graduates of CDS are now coming on board to participate in the Department's Industrial (Professional) Training field attachment programs. They are representing their employers by involving in the designing of fieldwork plans that are tailored for our students' training needs.

3. Short Course on Workplace Safety & Risk Management

After it was suspended due to COVID-19 in 2020, many more professionals are showing interest in the Department's short course on Work Place Safety and Risk Management. The first training commenced in early December 2021, and 29 participants graduated after two weeks of training with their Levels One to Three Certificates. Due to high demand, the short course will now continue on a regular basis as in the past from 2022 onwards.

4. Final Year Projects Relevant to Producing Employable Graduates

Both our final year (4th year) undergraduate and post-graduate (Masters and PhD) students are required to complete research projects to present seminars and submit reports as part of their respective study programs. Many of our final-year undergraduate students found employment during their Industrial Training experiences and thus joined the workforce right after graduation.
(One example in mind is Mr Clinton Naipao, employed while doing his IT with the National Gaming Control Board [NGCB] last year and then joined them early this year after completing his studies.)Over the last few years, our top MCS graduates also have gained employment in the Department as part-time tutors over the years after completing their studies.

5. Highlights of Outreach and Research Activities by Academic Staff

Highlights of staff outreach and research activities for 2021 included:

A. Ongoing Community Partnership Projects

Both staff and students are engaged in community outreach and/or consultancy programs as part of the course requirements as well as through academic interests. At the beginning of 2021, the Department met with an industry partner (National Gaming Control Board) in Port Moresby to review the Industrial Training engagement of our final year students under the MOA signed between PNGUoT and NGCB in 2019.

Journal Articles:

Wrondimi, G. (2020-2021). A Service Centre Development Model for Papua New Guinea – Cascading Communication Gaps and Pathways for Efficient Delivery of Services at the Ward Level, JCDS: Journal of Communication and Development Studies, VII-VIII: 160-77.

Paul, S. (2020-2021). The Emerging of a New Trend of Warfare in Enga Province of Papua New Guinea. JCDS: Journal of Communication and Development Studies, VII-VIII: 88-99. While dated 2020, the article was published in 2021.

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Gilder, E. (2021). Is Applied Human Justice Possible in a Meritocracy? A Comparison/Contrast of Answers from Rawls and Perelman. Tribute Colloquium to John Rawls: The Institute of Philosophy and Psychology "Constantin Rădulescu-Motru" of the Romanian Academy, Department of Epistemology and Ethics, Bucharest, 10-11 September (online participation).

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In May 2021, CDS Department joined the Department of Agriculture to attend a ground-breaking ceremony in one of our staff member's village (Hamara Village) at Kokoda in Oro Province to establish the Village's Community Transformation Centre. The Centre will become a venue for both staff and students (our IT students) to live with the people, conduct research, and assist the community in various activities. Our first batch of seven -year students who completed their IT and returned this semester (semester 1, 2022). They are the pioneers of this first arranged community outreach program between a rural village and the CDS Department. Similar arrangements are being planned with other communities, with initial discussions already commenced with the Ward Councillor of Laukano Village near Salamaua in Morobe Province.

The CDS Department continues its cooperation with the Wesleyan Bible College (WBC) in Mt Hagen, focusing on developing the (English-Language) Academic Writing Skills of theological instructors at WBC and partner theological schools, including Christian Union Bible College (CUBC), Christian Leaders Training College (CLTC) and others. Professor Eric Gilder, Dr Aisoli-Orake, and Ruth Moka have been involved in this program from the beginning, which started in 2020 as a conversation between missionary Cheri and Don Floyd asking for specialist expertise in developing the program. The Department is engaged and committed to continuing this project as part of its community outreach and development mission, and trusts that sound, applicable action research can be generated by it.

B. Research Activities
Edited Journal:

Gilder, E. & Ciocoi-Pop, M., et al. (2020-2021). JCDS: Journal of Communication and Development Studies, VII-VIII (pp. v-181) ISSN 1992-1322. Published in cooperation with UNESCO Chair in Quality Management of Higher Education and Lifelong Learning,"Lucian Blaga" University of Sibiu, Romania.

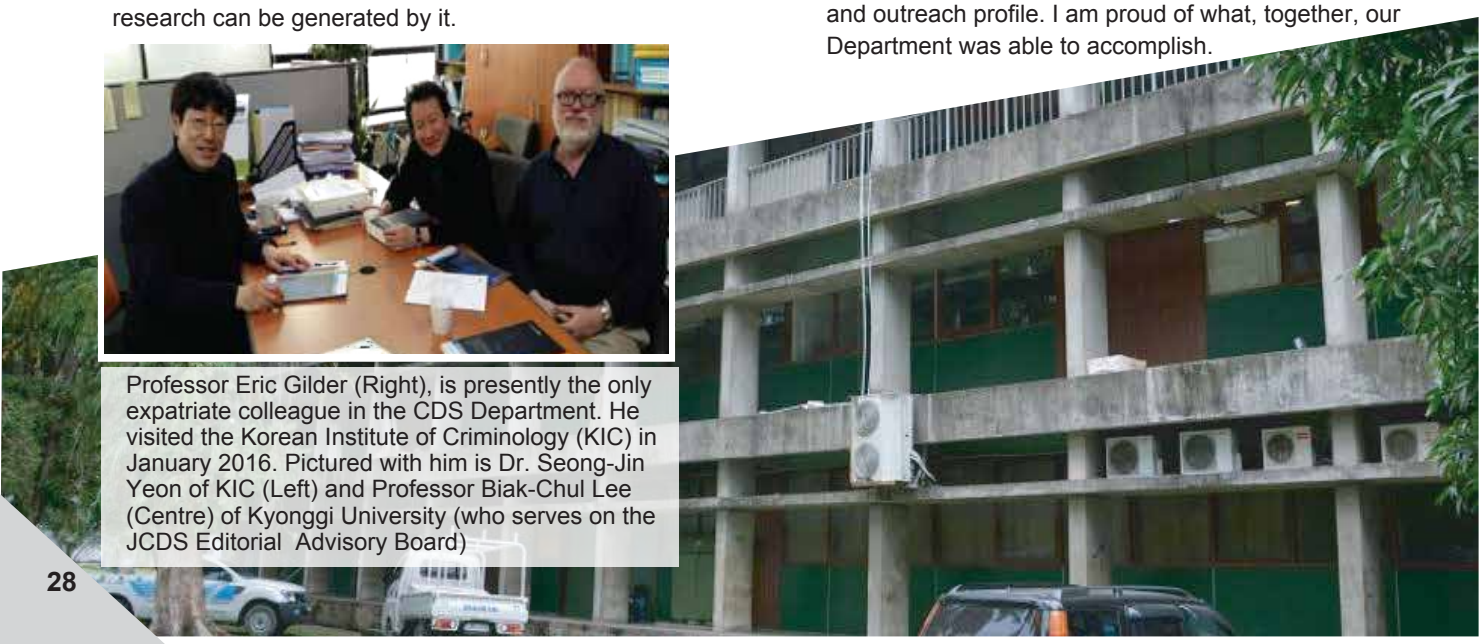
6. International Benchmarking of Undergraduate Academic Programme

In 2021, the Department submitted itself to an international benchmarking exercise of its revised undergraduate academic program, undertaken by Prof Dr Habil. Silvia Florea of the Lucian Blaga University of Romania. A fully experienced auditor of university academic programs, Professor Florea submitted her report on this exercise, "Proposed Measures to Increase the Added Value of the Communication and Development BA Study Program at PNGUoT," to Department and University management on 8 February 2022. We are now in discussion with her and the SEMT on retaining her services continuingly to implement the recommendations of this benchmarking report.

7. Conclusion

Overall, 2021 was a year in which the Department came out from under the shadow of the COVID-19 pandemic in good shape, not losing momentum in both extending the scope and refining the quality of our teaching, research, and outreach profile. I am proud of what, together, our Department was able to accomplish.

Professor Eric Gilder (Right), is presently the only expatriate colleague in the CDS Department. He visited the Korean Institute of Criminology (KIC) in January 2016. Pictured with him is Dr. Seong-Jin Yeon of KIC (Left) and Professor Biak-Chul Lee (Centre) of Kyonggi University (who serves on the JCDS Editorial Advisory Board)



DEPARTMENT OF ELECTRICAL AND COMMUNICATION ENGINEERING

Electrical and Communication Engineering of the PNG University of Technology teaches courses in power systems, renewable energy, process control and instrumentations, radio communication, and information and communication technology. Electrical and communication engineers design power generations and substations, transmission lines, distribution lines, computer networks, and communication networks. Power and Communication are two critical infrastructures apart from the transport systems, which are the lifeblood of the national economy. Electrons and electromagnetic waves are the nerve systems of the electrical and communications world. Electrical engineers design network infrastructures that keep the electrons flowing from the highlands to the coast to supply power.

Communication engineers design the network infrastructures, such as wireless technology, which are the source of electromagnetic waves that keep information being processed for transmission to interact in the real world. When you tune your radio, watch TV, send text messages on mobile phones, or cook in a microwave oven, you are using electromagnetic energy. You depend on this energy every hour of every day from your mobile phones, and televisions for communications and entertainment. What would the world be without electromagnetic waves and the electrons that flow through the electrical networks? It will be a chaotic world with no aircraft to fly, no ships to operate, no power, and no communications.

The Department of Electrical and Communication Engineering consists of 8 full-time academics, 9 seasonal academic staff, one online Professor, and 10 technical and administrative staff. About 200 undergraduate students, 9 postgraduate students enrolled in M. Eng. by course work and MPhil programs, and another 5 candidates enrolled in PhD studies.

1. Teaching and Learning

The undergraduate program covers mathematics and physics in addition to the core curriculum in either power engineering or communication engineering and other required electives. The program enables students to specialize in one of the following majors: Communication and Power Engineering. The courses are accredited by Engineers Australia (EA) at Level 8 honors degree, which has granted Provisional Accreditation. Course subjects developed and mapped to EA Stage 1 Competency Standards and the PNG National Quality Framework Level 8. The Competencies and Elements of Competency represent the profession's expression of the knowledge and skill base, engineering application abilities, and professional skills, values, and attitudes that must be demonstrated at the point of entry to practice. The requirements of EA include the following elements of competency:

(i) Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.

(ii) Conceptual understanding of mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.

(iii) In-depth understanding of specialist bodies of knowl edge within the engineering discipline.

(iv) Discernment of knowledge development and research directions within the engineering discipline.

(v) Knowledge of engineering design practice and contextual factors impacting the engineering discipline.

(vi) Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline.

The ECE Department has undergone vigorous course restructure aligned to meet the EA Stage 1 Competency Standards. Other requirements of accreditation include furnishing all laboratory equipment.As a result, the Department boasts of the latest state-of-the-art laboratory facilities in both the Power and Communications streams. In the final year of their studies, students undertake research projects on various topics in Electrical Engineering. The students show their ingenuity and innovation in researching various topics, building prototypes, undertaking design and simulation models, and presenting their work at the end of the academic year. The research projects are designed to trigger students' engineering curiosity and find new methodologies to foster innovative design that employ the synergistic effect between design and innovation as the key to promoting engineering ingenuity.

2. Research and Publications

The postgraduate research activities are ongoing, with four (4) candidates now enrolled in the PhD programs and 9 candidates undertaking Master's degrees. One of the key priority is the implementation and sustainability of staffing. The Electrical Engineering Department plans to have about 70% of the full academic carder to be filled by national staff members. The Department is focused on the next 10 years to have a minimum of 90 % of national PhD degree holders who will be able to work together, giving significant research leadership in the global scenario.

The major research areas undertaken at the postgraduate level are:

(i) Electric Power Systems,
(ii) Renewable Electric Energy Sources, and
(iii) Advanced Wireless Technology.

Electric Power Systems

The ECE Department has made significant progress in electric power systems in inter-disciplinary areas, including wireless technology applied to power system monitoring, renewable energy generators such as micro-hydroelectric generators and DC grids, and power system grid extension involving the AC power grid and renewable electric energy generators.

The work has been published in a journal. Moreover, the ECE Department received a partial grant from the University for a Major Interdisciplinary Research Project. Further, ECE Department is looking at the overall PNG grid from the perspective of systems reliability and contingency of the Ramu, POM, and Gazelle electricity grids in PNG.
The work will also consider the system performance from the reliability and sustainability perspective with grid interconnection of renewable energy systems to the main power grids.

Renewable Electric Energy Sources

A working pico-hydroelectric generator was designed, installed, and controlled. The work been published in a journal. A related published work was on a comparative study of ways to connect distributed solar panels supplying electricity to a village with clustered loads. Further, research on hybridizing and control of various renewable energy technologies in microgrid systems for remote communities is being undertaken in the Department by MPhil students.

Advanced Wireless Technology and ICT

Advanced wireless technology work has developed several powerful and new software tools for beam controlling in 4G and 5G, 6G wireless systems. Work on studying and improving the wireless systems in Lae City and on the University campus is underway, as well as the design of better data capacity and speed at economical costs and the possible use of the 5G system to replace the present system. Moreover, research on the Port Moresby Jackson airport aircraft to control tower communication and signaling systems is underway, particularly addressing signal glitches or interruptions.

In 2021, ECE staff members published 14 refereed journal papers and two separate textbook chapters. It must be noted that, in several sub-disciplines of Electrical and Communication Engineering, conference publications are a privileged means of fast dissemination and are sometimes regarded as journal publications. Most of those publications are done in collaboration with supervised graduate students and a Professors in ECE. Further, several national staff members of the Department have contributed to various chapters of the following books:

(i) P. R. P Hoole, Smart Antennas and Electromagnetic Signal Processing in Advanced Wireless Technology: with Artificial Intelligence Application and Coding, River Publishers, Nov. 2020. ISBN-13: 9788770222068.

(ii) P. R. P Hoole and S.H. Hoole, Lightning Engineering: Physics, Computer-based Test-bed, Protection of Ground and Airborne Systems, Springer Verlag GMBH, Feb 2022. ISBN: 9783030947279.

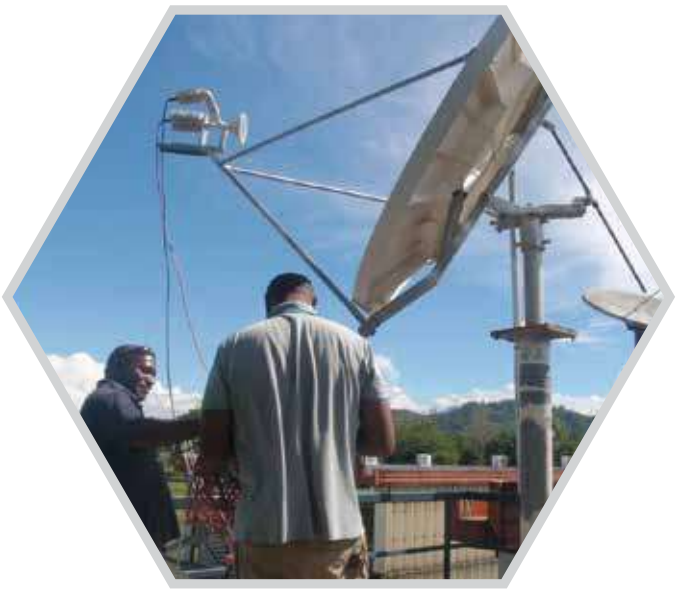
3. Community Outreach

ECE staff members remain strongly involved in community outreach, where staff members and students undertake outreach programs on energy and communication accessibility in remote communities. Some community outreach work included feasibly studies of renewable energy systems such as photovoltaic systems design and micro-hydroelectric power design. Further, the Department was engaged in school internet connectivity to empower teachers and students to access online learning materials. The community outreach program is ongoing in empowering rural and fragmented communities to access electricity and internet services. Electrical Engineering Alternate Path-way Program

As the Papua New Guinea University of Technology's vision is to "Grow World-Class Technocrats for the Real World" according to its Strategic Plan 2020-2024, the Department of Electrical and Communications Engineering has established a diploma in Electrical Engineering as an alternate pathway for students to gain industry certified qualifications that will be recognized globally. EE-APP (Electrical Engineering – Alternative Pathways Program) is the Department's home-tailored program developed to address the problems of increased drop-out rates in secondary schools and increased unemployment. Industry-certified training programs form the heart of the ECE Department's development model, which is focused on developing "people skills." The two industry certified programs that are currently hosted in the Department are

(i) Cisco certified training program and
(ii) the Huawei-certified training program. Further, the Department is in the process of registering a third alternative pathway program through City and Guilds of London.

The Department started the EE-APP in March 2021 with its first batch of 70 students enrolled in the program. The EE-APP program is focused and aligned to the job market with individuals' desire to secure robust employment opportunities to meet employers' specialized knowledge and skills needs. Through the EE-APP, the Department of ECE is not just providing an education but lifelong skills and career opportunities in addressing broad-based workforce gaps, especially in Electrotechnology, including the emerging areas of Renewable Energy and Information Communications Technology (ICT). As skills are a form of currency in the working world, the Department strongly focuses on industry-certified diplomas to empower diploma graduates to attain the technical skills for the national and global job markets. Thus, improving the quality of education and skills development is more responsive to economic growth in eliminating poverty by reducing the cost of living for low-income earners and working-class citizens.



Milestones

(i) ECE Department will be graduating 4 MPhil candidates in 2022. All candidates have successfully passed their thesis examination requirements to graduate.
(ii) ECE Department staff members have contributed to various chapters of two textbooks published internationally.

DEPARTMENT OF FORESTRY

Introduction

Another academic year is over, and we appreciate all our stakeholders and partners, especially students, their parents, and sponsors, for all the support rendered DURING the 2021 academic year. It is another year living and learning about the COVID 19 pandemic wherestaff and students have to cope with new strategies and approaches to learning, training, and research. Completing this academic year successfully is a success story we all can appreciate and share.

The Forestry Department's mission is to produce professionals, both men and women; with scientific and technical production skills and expertise needed to manage Papua New Guinea's forest resources sustainably while tailoring the curricula to meet regional and global job market requirements.

Our teaching and training philosophy is that a well-managed forest is an asset to local, national, and regional economies for current and future generations. The essence and relevance of this philosophy are not only valid but timeless too.

The Forestry Department has been training professional foresters for PNG and the region at the Bachelor's Degree level since 1972, with the first graduates in 1976. To date, our graduates are employed as scientists, administrators, and managers in the public and private sectors, NGOs, and CBOs locally and within the Asia Pacific Region. Others become entrepreneurs and community leaders serving various roles throughout the Pacific region. As we take pride in our rich history, our vision is to strive for improved training, teaching, and research standards through international accreditation in the near future.

Undergraduate courses and Revised curricula

The Department has two campuses, the Taraka Campus and the Bulolo University College Campus offering both Bachelor in Forestry Science and Diploma in Forestry programs. The Bachelor's degree is a four-year program partially taught on both campuses, while the three-year Diploma program is taught on Bulolo University Campus. The curricula for the two programs emphasize forest management, environmental protection, and multi-purpose forest resource surveys, including wood technology and forest-people interactions. The course work are complemented with field trip components to surrounding forest areas, forest industries, and communities in Morobe Province. The Bachelor's degree program also requires students to complete 60 days of professional work experience on their initiatives during the holidays.
This is the third year of implementing the revised Bachelor's degree curricula, whereby many of the subjects taught in the past are condensed into four main subjects per semester while increasing teaching hours per week to six (6). This review was done on all courses at PNG University of Technology to be on par with the changing trends of higher learning and teaching in the region and facilitate a pathway to accreditation.
The Department is excited as it will produce the first batch of graduates under the new curricula next the year 2022.

Postgraduate Programs

The postgraduate programs consist of MSc, MPhil, and PhD in Forestry for a duration of two years for each Masters' Degree and three years for PhD studies. The PhD studies are dependent on the availability of supervisors at the moment. Since 2014, about four on average postgraduate students have graduated, with 2 more MPhil students to submit their thesis in November and graduate in 2022. There has been an increase in the number of students interested in doing Postgraduate studies in recent years.

Department staff and Training

There are 14 current full-time faculty members teaching on both campuses, and two of the faculty members are currently undertaking their PhD studies abroad and are expected to join the Department as early as 2022. One of our technical staff will graduate with MSc in Solid Waste & Resource Management (SWRM) in 2022. Five faculty members have completed their Postgraduate Certificate in Higher Learning and Teaching this year and are expected to graduate early next year.

The Department is also upgrading the qualifications of administration officers where a female administration staff is undertaking her Diploma in Business Management at the Lae Polytechnical institution.

Research, consultancy, and stakeholder engagements

The Department's engagement in research, consultancy, and community development projects this year has been affected by the COVID 19 pandemic, however, through final year student projects and field trips, engagement with stakeholders was maintained. Four students are currently doing their research projects with Markham Valley Biomass Ltd, while few others are engaged with forest industries and communities around Lae city.
In September, the final year students also undertook a field trip to Eastern Highlands Province to visit tree farmers and local forest product industries, in which research and training areas were identified for potential future engagements. The Insect Farming and Trading Agency, a University's business arm housed at our Department, is currently creating networks with communities around the country to promote community partnership programs.
As part of the newly revised curricula, the Department has been in regular contact with a couple of industries to engage our students during the 2020 holidays as part of their industrial experience. Many companies have indicated favorable responses, including the National Forest Service, PNG Forest Product Ltd, and others around the country. The Department is currently working on an MOU with PNG Forest Authority to facilitate the 60 days of professional work experience for our students.

Congratulatory and Complimentary messages

The Department wishes to congratulate the following staff;
* Mr. Charles Feriwok has completed his MSc in Solid Waste & Resource Management and will graduate next year in 2022.

* Mr. Louis Veisami, Mr. Benson Gusamo, Mr. Olo Gebia, Mr. Koniel Alis, and Ms. Priscila Menin who completed their Postgraduate Certificate in Higher Learning and Teaching this year and will graduate in 2022

Finally, we extend our appreciation to all our stakeholders and partners who have supported us to complete this academic year 2021.

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

The Department offers two four-year Bachelor of Science degree programs. One in Computer Science and the other in Applied Mathematics and provides services for all other academic Departments. This service to other Departments involves the teaching of specifically tailored ICT and mathematics subjects. The new Applied Mathematics program will start the next year, 2022, with its first intake of about 25 students.

Our mission is to produce quality graduates in computer science and applied mathematics with standards comparable with other regional universities, as well as provide suitable and relevant service subjects to meet the requirements of other academic programs.

1. Teaching Activities

The Department revised its computer science subjects to adhere to the requirements of the engineering programs accreditation process PNGUoT is currently undergoing. The new curriculum has four subjects per semester, and each subject will have a six-hour contact time per week. A total of 32 subjects enables the students to cover all areas of Computer Sciences, including ICT, Networking, Databases, Programming, Operating Systems, Software Engineering, and Artificial Intelligence. This gives our students the advantage of being introduced to all areas of computer science before entering an industry where they will begin to specialize.

The new applied mathematics program is tailored to produce graduates in the higher education sector with a solid grounding in mathematics and the ability to solve industry-based problems in Statistics, Reliability, Science, Technology, and Engineering by developing their mathematical and computing skills through advanced computing aids with appropriate theoretical base.The mathematics service subjects have also undergone a lot of changes. Most of the other Departments that Departmental staff teaches have preferred to trim down on the number of mathematics subjects by compacting the syllabuses. This often means two subjects in a year are combined and taught in one semester. This has decreased the number of subjects the Department teaches per Department, but the contents are more compact and rigorous.The current staff profile includes five PhDs, ten Masters, and six Bachelor's degree holders. In addition, the Department engages three to five part-timers each semester to make our programs operational. As a result, staff are generally very committed and competent.

2. Graduate Feedback from Industry

The Department has received calls since the year before from Oil Search, PNGFM, Nasfund, major banks, major telco companies, and other companies interested in engaging our fresh graduates. The demand for Computer scientists is increasing with the rise in new technological developments around the globe. Yet, the Department has not received any written acknowledgment of its recent graduates' performances in the industry, but we have received verbal feedback.

(For example, we have heard favorable reports of our graduates working in the banking industry.)
We know different industries will require different skills, so the Department aims to provide the basics for its students to be adaptable before entering the job market. Specialized training in varied industries is necessary because of the diversity and constant evolution of technology.
The mathematics provided to other disciplines ensures that the graduate has sufficient mathematics knowledge for logical reasoning, identification of appropriate mathematical tools for problem-solving, and competent computation ability. The HoD's visit to Kutubu Oil and Gas project site in (2019) gave him the opportunity to meet and talk with graduates from other disciplines where mathematics has been a vital ingredient in their performance at the workplace.

3. Final Year projects

Our student projects mainly cover the areas of databases, programming, and networking. Students can create a database to store information. They then write programs to process and retrieve these data from a database. Then they build a website through which one can access these data. The website will contain icons that one clicks, and it automates a program to retrieve the data, process it, and displays the data for use. This procedure has been used in many applications, such as ordering and buying items online, registering online, using office filing systems, etc. For example, one student did a project on the MVIL system. He created a web interface for motor vehicle owners to update their information on the system and send alerts to vehicle owners when their insurance cover is about to expire.

4. Research and highlights of publications

Our research areas in Mathematics depend on the staff composition. Our main areas are topological groups and rings, mathematical modelling and differential equations, statistics, and discrete mathematics. In Computer-Science, current interests include database systems and building computer apps that can store, process, and retrieve data. Professor, Mihail Ursul, was an all-season writer and continues to contribute one paper each year for publication in distinguished journals. Professor Ursul will retire in 2021 and leave the Department, however, he is supervising a PhD candidate Mr John Lanta, and a Master's candidate Mr Alois Wemin. Mr. Mirou is our only computer science staff undertaking PhD studies, and his research is on the application of ICT in Agriculture.
Mr Boaz Andrews will be graduating with MPhil in Mathematics and will be given a contract once the external examiner accepts his thesis. Mr Puy and Mr Tahie will return from India in June 2022 after completing their MPhils in computer science and mathematics, respectively.Three other staff (Mr. Abuzo, Mr. Tom, and Mr. Angra) are currently enrolled in the Master of Philosophy program at PNGUoT.
Two others (Mr. Nerit and Mr. Tahie) have since graduated with Post Graduate Certificates in Student-Centred Teaching offered by TLMU. Mr Peter Helebi is currently undertaking the Post Graduate Certificates in Student-Centred Teaching offered by TLMU.

5. Community and Industry Engagement

The Department is involved in writing Department of Open and Distant Learning (DODL) Mathematics exams each semester, PNGUoT's non-school leaver entry examinations each year, and the PNG Grade 12 national examinations each year.
The Department staff have been engaged in tutoring Maths and ICT courses for Unitech's Satellite Campus in Simbu Province.
The Department's engagement in the industry so far has been with ACIAR through Melbourne University to build a database of forest data. This has been completed. Its second engagement, which is still in progress, is with FAO through NARI in building an app to collect and store information and then statistically interpret the data later.

6. Consultation

tSMAS Learning Management System has been integrated with the main student records system for student marks in semester 1 this year. A module was created for tSMAS to be integrated with the main student records system. Within the PNGUoT, the Department continues to provide statistical support to research activities for staff and students. The Department has also assisted sections of the university with developing packages such as the water-billing system for PNGUoT. The system is still under consideration by the senior management.
Technical training is also provided to personnel in the ICT industry, focusing on software design and development with cutting-edge technologies.

7. Other Achievements

This year (2021), the tsMAS system developer (Mr Nerit) was asked to help with the student records for semester one. He accomplished the task in 3 weeks with all department student records successfully entered into the student's records database. The system is home-grown, and all technical and administrative issues can be handled locally.
The Department has its assessment system application (called tsMAS) that stores, processes, and retrieves its assessment records for various University requirements. It has been trailed for five years and has worked well for the Department. The Department also held regular seminars on a wide range of topics. This year's presentations targeted theuniversity's efforts in online teaching. Thus, presentations were on:

1. Uni10 system grading process by Student Records Team.
2. Updates on tSMAS Learning Management System by Lenz Nerit.
3. Discussion of new Mathematics and CS Syllabus by the Department Syllabus Team.
4. Using Mathematica Application Tools by Dr Mohsen.

The presentations were in parts; listed are the topics, but they were broken into series for each topic. For example, the Uni10 presentation had 3 parts presented over 3 weeks.

DEPARTMENT OF MECHANICAL ENGINEERING

The Department of Mechanical Engineering (Dept. Mech Engg.) at Papua New Guinea University of Technology (PNGUOT) has been offering quality undergraduate education through student-centered teaching and learning. The Department also has been delivering postgraduate and Ph.D. programs over the years. In addition, the Department has continuously collaborated with industry and developed linkages with international institutions and partners. Currently, the Department is in the process of creating a partnership with the University of Malaysia Perlis. To support its sustainable growth, the Department follows the strategic plan for 2020-2024 developed by the University.

An operational and succession plans have also been prepared based on this strategic plan. The Department is also engaged with the communities in PNG to deliver projects for mutual win-win situations and benefits. Students are also encouraged to align the objective of their final year projects to solve the socio-environmental problems of PNG.The Department of Mechanical Engineering has recently got its 4-years Bachelor's degree program provisionally accredited by Engineers Australia. In compliance with accreditation guidelines, the Department introduced a new syllabus 2019.

1. Teaching Curricula

The Department has adopted the policy initiated by the PNGUOT to get its engineering program accredited by Engineers Australia. In this process, the Department identified the requirements for redesigning the course structure through the assistance of the external accreditation adviser and inputs from the industry. As a result, the revised curricula prescribe an offering of four subjects per semester. It concentrates on the following field of study Design of Manufacturing, Thermo-Fluids, Materials, Mechatronics, and Renewable Energy.Few new elective subjects were also proposed based on industrial inputs and societal needs. The new course structure is already implemented in 2019 for the first year, 2020 for the second year, 2021 for the third year, and the final rollout in 2022 for the fourth year. We are modernizing our laboratories and getting them equipped with new types of machinery to provide adequate laboratory experience to all the 4-year students during this accreditation process.

2. Teaching experience

The current academic staff of the Department is comprised of a balanced pool of faculties comprising young, middle-level, and experienced faculty members. Possessing national and expatriates with excellent academic and research backgrounds from all major areas of mechanical engineering is one of the major strengths of the Department. The Department is encouraging its Bachelor's students to pursue higher studies to develop the national workforce in the Department.

3. Graduate Feedback

The courses offered/taught in Mechanical Engineering are tailored to conform to industry standards and requirements.The courses are designed to enable our graduates to adapt and effectively mitigate the real challenges encountered by the industries operating in PNG and other parts of the world.One of the many challenges graduates face is correctly applying the knowledge gained in class and translating it into practical applications in the industry. The above challenge can be met via the new initiative of industry visits, inviting guest speakers, introducing capstone projects in the final year, and using the problem-based learning approach. We have received excellent feedback from our industrial partners on our graduates' performance who are employed in many industries across the country, especially in Mining and Petroleum industries. Many of our recent graduates are employed by Industries across the country.

The following members from the industry visited the Department as guest speakers and are as follows:

1. Pacific Cranes & Engineering Limited -- Mr. Sam Ale and Mr. Kanau Iobuna visited the Department.
2. MRA – Mining Resource Authority (PNG Mine Inspector)---Mr. Lave Michael and Andrew Onguglo visited the Department.
3. IEPNG Board Members Visitors---Dr. John Miin & Mrs. Edea Bouraga, both Board Members, visited the Department.

4. Final Projects and Relevant Preparation of Employable Graduates

Students are given hands-on training through projects and group work to equip them to handle workplace challenges. Our students are allocated final year projects in the first semester of their fourth year. The project allocations are based on their choice and designed to develop analytical, decision-making, and R&D skills as employers require. In 2021, two of the final year student project are from the mining industry. The OTML has requested students to look at a problematic conveyor transfer chute design. Newcrest Mining has challenged students to look at the Mill Thrust Bearing failure.

5. Research and Publications

Our staff is actively engaged in research in their area of specialties and interest. In 2021, the following research was carried out in the Department.

Total Number of Publications in 2021:		20
o	In International Journals:	19
o	At International Conferences:	1
o	Book Chapters:	1
o	Patents:	2

A few of our staff are appointed as external examiners for PG and Ph.D. thesis by several foreign Universities. The academic staff has filed for a couple of patents in 2021.

6. Community and Industry Engagement-Consultancies

Two academic staff members serve on the Technical Vocational Education & Training (TVET) Committee to review tertiary institutions in compliance to meet the PNGNQF. One of the academic staff is the elected Chair of the Mechanical Working Group with NISIT, based in Port Moresby. The staff member is also on the National Polytechnic Institute Academic Board (NPI) Papua New Guinea, based in Lae.

7. Staff Post-Graduate Studies Development

Two academic staff members, Mr. Brian N'Drelan (PNG UNITECH) and Jack B Khallahle (The University of Sydney, Australia), are in the final stages of their Ph.D. thesis.

8. Congratulatory and Complimentary messages

The Department wishes to congratulate our academic-staff Dr. Steve Korokan Ales, for completing his Ph.D. from AUT, NZ, in December 2021. Finally, we extend our appreciation to all our stakeholders and partners who have supported us to complete this academic year. The Department looks forward to more and improved collaborations and partnerships in 2022.

Wind Tunnel

Free ad Forced Vibrations

Steam Turbine with Steam Generator

Refrigeration Unit

Guest Speakers: Mr Sam Ale (Operations Manager) & Mr Kanau Iobuna (Mechanical Engineer – specialist with Boilers)

Guest Speakers: Mr Lave Michael (PNG Chief Mines Inspector) & Andrew Onguglo (PNG Mines Inspector) with MESSA students and Mech Eng HoD Dr Shoeb Ahmed Syed.

Our Mission is to produce quality employable graduates for the mining and resources industry who are competent engineers in the designing and extracting PNG's natural resources. 2021 has been another great year for our Department. The Department has continued to progress in the key areas of its main strategic pillars. Particularly;

- Teaching and Curriculum Development
- Graduate FeedBack (Industry and Graduates)
- Industry Engagement and Partnership
- Industry-Based Real Live Final Year Project
- Research and Research and Publication
- Consultancy and Short Courses

1. Teaching and Curriculum Development

The Department offers two (2) degree programs:
a Bachelor in Mining Engineering and a Bachelor of Mineral Process Engineering. Departmental staff members have aggressively participated in developing the curriculum to upgrade from the old system to the new accreditation requirements of four (4) subjects per semester. It has been challenging from the start; however, staff has understood the need to revise, improve, and upgrade the syllabus to meet the accreditation requirements. Most importantly, the review of its syllabus is ongoing to meet the accreditation requirements. Continuous improvement of our programs requires more comprehensive stakeholder input, especially from the industry, alumni , and the public at large. Hence, staff are working closely with the stakeholders to achieve that goal.

DEPARTMENT OF MINING ENGINEERING

In 2021, we reviewed and submitted the final syllabus for our 2 programs, and it was approved for implementation in 2022. Effectively, this brings us to the end of the syllabus review for our 2 degree programs.As part of the new syllabus, the Department aggressively devised practical, fieldwork, and laboratory test work to achieve the learning outcomes. Notable achievement includes rock drilling as part of the ROCK FRACMENTATION (Fig.1) and alluvial mining dredging as part of MINERALS ENGINEERING and MINING TECHNOLOGY (Fig. 2).
We also use industry samples, particularly, K92 Mine, for sizing and flotation work as part of our syllabus and provide results and feedback to K92 for their ongoing mine milling and plant expansion project.

2. Graduate Feedback (Industry and Graduates)

We continue to receive positive feedback from the Industry for both Mining and Mineral Process engineering graduates performance in the Industry. We have received an excellent feedback from the industry on our graduates' performance who are employed in the Mining and Petroleum industry. A recent survey and feedback from the K92 mine showed that all mine engineers to mine superintendents are our graduates. In appreciation of that, the K92 Mine Limited has donated another K60,000 to support the Department to continue producing quality graduates. In 2020, K92 Mine donated K50,000.
In 2021, our students (Mining and Mineral Process graduates) did very well securing graduate positions inMining, Oil, and Gas industries. A visit by ExxonMobil made by our very own alumni with the team of engineers made very positive comments and remarks on our graduates and looked forward to recruiting more graduates from our Department.We placed 5 of our Mining engineering students for industrial training in Ok Tedi and 5 students at Lihir Gold Mine, and 4 at the K92 mine. Students' performances were rated as outstanding.

Figure 3. OK Tedi Mining Industrial Training

3. Industry Engagement and Partnership

The Department to grow and expand on its industry engagement and partnership. Ok Tedi Mining came on board in 2021 for the first time after a long while and took 5 students for industrial training. These students were engaged for more than eight weeks. While -site, some of these students were offered graduate development programs based on their performance.In 2021, our -term partners, Mineral Resources Authority (MRA) and PNG University of Technology, collaborated and hoisted the 5th PNG National Alluvial Mining Convention and Trade Show hereat PNG University of Technology. The convention was a great success. The convention show participants, land owners, commercial banks, investors, and most importantly, the involvement of our own Mining Engineering staff and students association fully participating in the 3 days convention here in UNITECH.

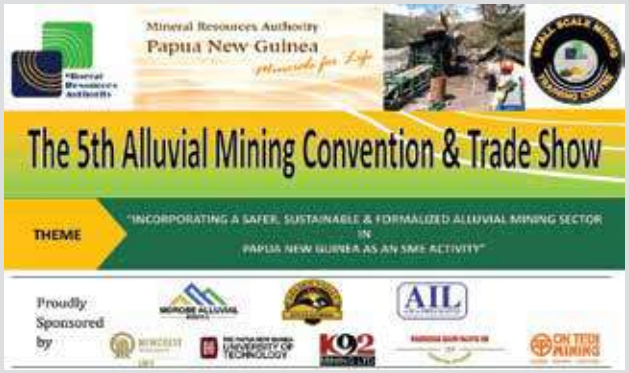


Figure 4. Hosting the 5th PNG National Alluvial Mining Convention & Trade Show here in UNITECH.

In 2021, the Department benefitted greatly from the outcome of hoisting the 5th Alluvial Mining Convention here in Unitech. The Department was given a K400,00 worth of the project. The project is to develop an alluvial mining ore resources evaluation standard that can be used in the alluvial mining industry in PNG to assist the developers and the land owners in securing funding to develop their resources. The project has 3 phases.
Phase 1 includes training and up-skilling work of its workforce worth K400,00. Phase 2 involves fieldwork, sampling, and developing the resources evaluation code which is worth K700,000. The final phase 3 involves actual standardization and pilot projects to validate the evaluation standards and is worth K2,000,000.00.

Figure 5. Developing Mineral Resources and Reserve Estimation Code for PNG Small Scale Mining Sector

4. Industry-Based Real Live Final Year Project

The Department continues to gain momentum in engaging with the industry. This year, 2021 the Department has received 10 live industry-based final year projects. K92 mine has given 5 of their problems to our final year students to work on as their final year research project.
The topics include;
4. Tailing Dam Design
5. Underground Mine Ventilation efficiency
6. Determination of Bulk Density of K92 Ore
7. Flotation
8. Alternative Mining Method

For the first time, Orica Explosives conducted one day intensive course on Explosives and Blasting and gave certificates to our third year Mining engineering students. In addition, Orica explosives also allowed our students to participate in plant site visits here in Lae.

Figure 6. Orica Explosives one-day intensive training course followed by awarding of certificates

5. Consultancies and Short Courses

Offering short courses, providing professional advice, and engaging with industry and external partners through consultancy is gaining recognition this year 2021. The Department continues to conduct several short courses for the industry as part of its ongoing service to industry employees' professional development needs. As a result, the Department rised over K150,000.00. Some of these courses were conducted at the request of the industry as they see the need to upskill their workforce. This year, the Department has conducted the following short courses:

- Occupational Health and Safety Engineering
- Geomechanics and Structural Engineering Geology -1
- Mineral Economics – Techno-Economic Decision making, Financial Evaluation, Investment Analysis, Taxation, Royalty and Policy

Figure 1. Rock Drilling Laboratory conducted by our 3rd years

Figure 2. Hydraulic Suction Dredge field alluvial mining conducted by Mining and Mineral Processing students

DEPARTMENT OF SURVEYING AND LAND STUDIES

The Department of Surveying and Land Studies offers many subjects, which could be broadly described as the collection, collation, analysis, interpretation, and application of spatial and economic data associated with the land, and production land professionals through three undergraduate courses, which are Surveying, Geographical Information Science(GIS) and Property Studies (property valuation, property management, and land administration).
The Department emphasizes the application of technology for land professionals in the sustainable development of PNG.
Accordingly, land professionals are given broad exposure to the state-of-the-art technology, e.g., recent developments in the field of Remote Sensing (RS), Geographic Information System (GIS), Global Navigation Satellite Services (GNSS), use of the latest Total Stations, drones, and allied implements of the digital era in their respective disciplines. Figures 1-4 show how our two newly acquired drones were delivered and set up for use.The Department has good facilities, including a comprehensive digital mapping, geographic information systems and remote sensing laboratory, state-of-the-art global positioning systems technology and software, a cartographic procesing laboratory and automated surveying systems, and the traditional/normal surveying and mapping facilities. The Department has three related academic sections, namely:

1. Surveying Section

The Surveying Section's Mission Statement strives to produce world-class competitive graduates with in-depth-knowledge and adequate motor skills in all aspects of surveying techniques relevant to the profession and allied field of Geomatics. We also strive to enhance the existing capabilities of the Section's professional expertise through postgraduate studies and applied research in the emerging state-of-the-art technologies.
Hence, the Section recognizes the significance of embraing emerging surveying and mapping technologies, including GNSS, Automated Surveying and Mapping Systems, and Photogrammetry/Remote Sensing/Drones.

(a) Teaching & Curricular Activities
Currently, there are 119 registered, full-time students in the Section. The Section's efforts to recruit teaching staff have been futile due to poor remunerations and stringent university requirements, particularly for competent and experienced citizen surveyors. In addition, the Section lost a Professor and two lecturers through resignations, two Senior Lecturers due to deaths, and one through non-contract renewal.

In 2016, the Section embarked on a training scheme to retain our Council Medallists and graduates having Degree with Merit under the university's GAP program. Recently, the Section was fortunate to recruit the former Chief Mining Surveyor for Harmony Gold as PTO, and an experienced Cadastral Surveyor as STO2.

Unitech Dept of Surveying Lecturers (L-R) Navua Kapi, Dr Sailesh Samanta, with McLaren Hoping (ConnectedPNG), Professor Jacob Babarinde and GIS Lecturer, Lewi Kari show off the drones.

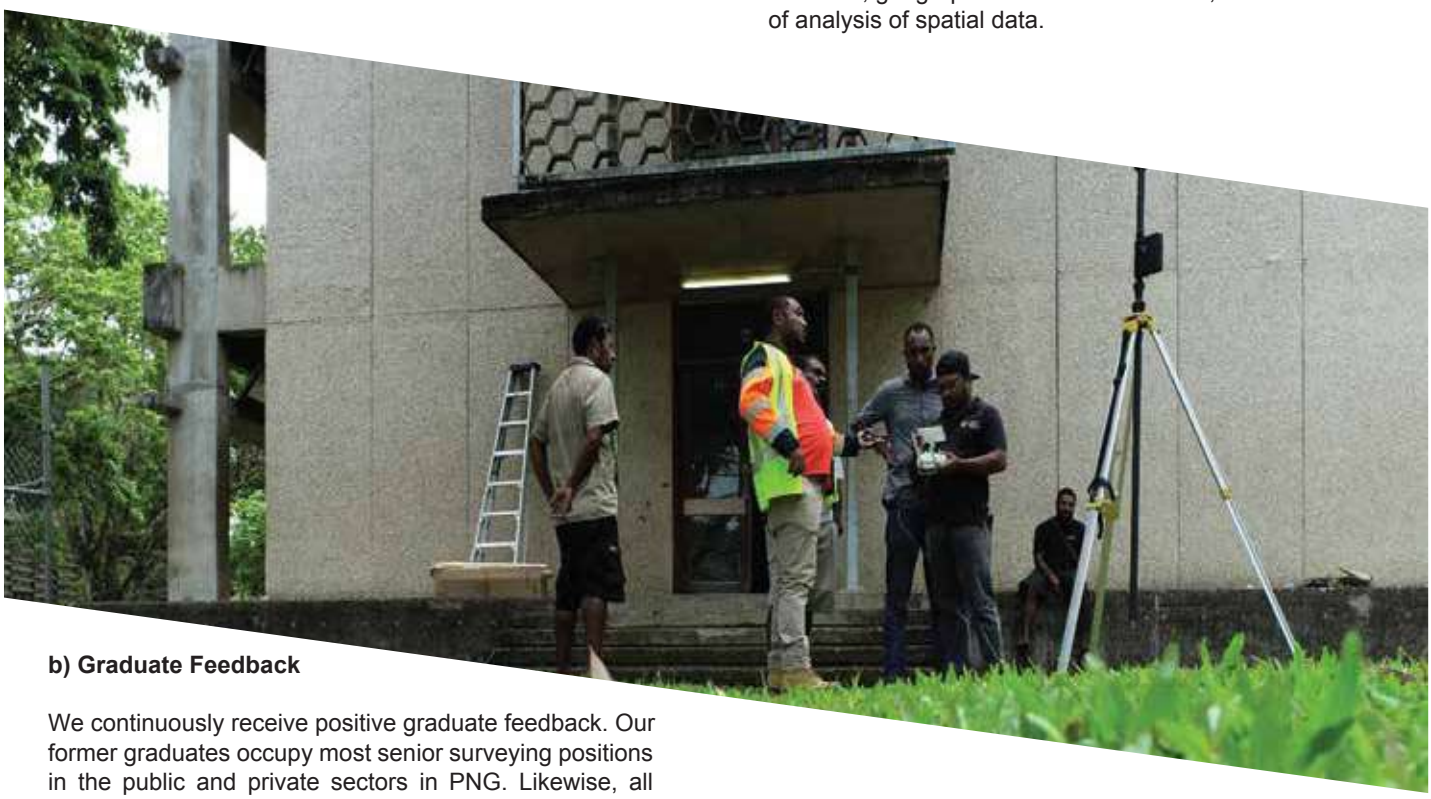
The Section's advertisements for an Associate Professor and a Professor in June 2020 are still pending. The Section needs a senior academic at the level of an Associate Professor or Professor to provide academic and research leadership. Most staff have a master's degree, and the individual level of professional/industrial experience ranges from three to 40 years. The old course (Bachelor of Technology in Surveying) and the new course (Bachelor of Surveying) syllabi are being taught as parallel programs.

d) Consultancies and Outreach

In 2019, the Section worked with the Defence Force to establish GPS controls and survey the area for the new army barracks in Southern Highland Province. Over the years, Mr. Navua Kapi has been engaged by the Project Office in setting out sites for new housing projects including the SDA Residential College at PNGUoT.
Survey camps for BTSR/3 and BTSR/4 are planned and conducted yearly to benefit groups and individuals in the community who are willing to collaborate and work with the Section.

2. Geographic Information Science (GISci) Section

The Mission Statement for the GIS Section focuses on the collection, storage, retrieval, analysis, and modelling of geographical data.. At the same time, Cartography specializes in the best way to visualize and present information. The two disciplines are closely related to other disciplines like surveying, geodesy, photogrammetry, and remote sensing, which concentrate on ways to measure accurately and collect information about features on the Earth's surface.
Together, these fields constitute the high-tech mapping sciences, geographic information science, or the science of analysis of spatial data.



b) Graduate Feedback

We continuously receive positive graduate feedback. Our former graduates occupy most senior surveying positions in the public and private sectors in PNG. Likewise, all practicing surveyors are former graduates and our former graduates occupy almost all the Chief Mining Surveyor positions. In the last 10 years, our graduates have been employed as mining surveyors in mines across Australia. Over 20 of our graduates currently work in different mines in Australia.

(c) Research by Students and Staff and Publications

All undergraduate and postgraduate students submit and defend a dissertation and/or thesis respectively in their final year, with due compliance with the University's plagiarism policy. Only a few individual staff in the Section have conducted research and published papers. Therefore, the appointment of a Professor or Associate Professor with a proven track record in research and publications is seen as a sine qua non for improved research performance.

(a) Teaching & Curricular Activities

Some of the numerous activities that the Section carries out include:

• Visualizing and effectively displaying complex spatial and socio-economic interrelationships. We are involved in designing, producing, and using maps; charts from physical, economic, social, and other data supplied from surveys, census, remote sensing, and existing maps.

• Conducting research to improve the mapping process and develops more efficient ways of representinggeographical features, creating and storing complex spatial objects, and handling features that change over time.

(b) Consultancies

Consultancies undertaken by the GIS Section include, among others: Suitable rice farming areas in entire Papua New Guinea (sponsored by Trukai Industries Ltd.); Climate studies/climate change modelling/-temp-rainfall interpolation by GIS; Exploring market accessibility of agricultural produce (in association with NARI); Rice suitability mapping for Morobe province using RS /GIS; Production of a tourist map (for the Tourism Development Corporation); Use of Remote Sensing to survey coffee plots in Eastern Highlands Province; Coastal monitoring and mapping; and Creation of a geographic database of land tenures (for East New Britain Province).

(c) Curriculum and Staffing

The implementation of a phased new curriculum structure of four subjects per semester has been completed for first and second-year programs, while Year three is now in process. The faculty strengths comprise three holders of PhDs,including two Associate Professors, and five Master's degree holders, including two who are about to complete their PhD programs.

There are 101 full-time BGIS students and 38 distance-mode BGEM students. The MSc RS/GIS program (distance mode) currently has no enrolled students, but admissions are being processed for the Year 2021. Thirteen students were eligible for Diploma/-Degree awards in Geomatics in 2020. In addition, the MSc (DODL) RS//GIS program that started in 2013 has graduated 25 students.

(d) Research Activities and Publications

All final year BGIS and BGEM students must carry out a supervised research project. The Section has graduated two in-house PhD graduates (Cathy Koloa in 2019 and Joeli Varo in 2020). Five MSc and one MPhil completions are expected in 2020, while two Departmental staff members and two external students are currently registered for PhD studies. 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 actively involved in research and publications, as indicated on the website (See publications under PNGUoT Research Report at www.unitech.ac.pg). Academic staff also attend local and international conferences from time to time.

3. Property Studies Section

Property Studies Section aims to take a proactive and strategic approach to fully integrate all aspects of real property to enable the graduates to take on the challenges in the market of this country, other South Pacific nations, and the global property market, and to prepare students for a variety of vocations with interests centred on real property.

(a) Teaching & Curricular Activities

The Section undertakes the following as part of its teaching activities at the undergraduate and postgraduate levels:

• Valuation – Land and property valuations for assessing market value (MV), statutory valuation, compensation assessments, valuations for indemnity/insurance, finacial investment analysis, and others.

• Land development and property management – focusing on the development process, lease management, repairs, property economics, and planning with other aspects of physical and financial management.

• Land Administration – Engages in carrying out Social Mapping, Land Investigations, ILG processes, and using the Land Administration Processes to formalize them.

The Section through Distance Learning (DODL) recently introduced a master's degree program in Urban & Regional Planning facilitated by Prof. Babarinde, which commenced in 2019. It is a very demanding course for Physical Planners in the land and property profession. As the course is expected to be viable with no direct funding by the government, we have observed that the high tuition fees charged to the participating students are not affordable to poor students. Therefore, we are now looking at ways to restructure the entire program through Academic Board approval to make it affordable and sustainable as soon as possible.

Our postgraduate program in Property Studies has been rejuvenated after being docile for a while. The degree of Master's in Property Studies (MPhil) by research is ongoing and avails for prospective students. The Property Section comprises knowledgeable faculties with vast industry and teaching experience cutting across the common areas of Property Development, Valuation, Viability Analysis, Property Management and Land Administration. Currently, there are 121 registered full-time students in the Section.There are eight full-time faculty, including two PhD holders, five Master's degree holders, and a PhD student on study leave in Australia. The eight faculty members have expertise in teaching Valuation, Urban & Regional Planning, Property Management, Property Development, Viability Analysis, Valuation, and Land Administration.

(b) Links with Industry, Graduate Employment, and Feeback

About a quarter of our graduates find immediate employment after graduating at the end of each year. Due to the current chaotic COVID-19 dilemma, we have experienced some challenges with fixing students for industrial work experience, particularly in 2021. The Section enjoys strong collaboration with the industry through the support of our Course Advisory Committee, which meets bi-annually

(c) Research Activities and Publications

Our faculties are increasingly expanding their research-and publications profiles in local and international peer-reviewed journals. Staff also attend local and international conferences and workshops as opportunities arise (See DSLS Research Reports on Unitech Website).

DEPARTMENT OF OPEN AND DISTANCE LEARNING

Teaching and Learning During the Covid-19 Pandemic

The Department of Open and Distance Learning (DODL) recognizes that education is a fundamental human right and a force for sustainable development and peace. It empowers people with the knowledge, skills, and values to live in dignity, build their lives and contribute to their societies. Although this is a truism, the historic disruption caused by Covid-19 in the year 2021 made it difficult for PNGUoT to smoothly execute its agenda towards this noble cause. With Covid-19 in the picture, achieving the desired teaching and learning outcomes demanded new instructional approaches, unique teaching and learning culture, and a different mentality and attitude. Cognizant of this reality, the PNGUoT, through the DODL, ICTs, and TLMU, championed the integration of technology into the conventional learning processes in preparation for more threatening times. It was a significant breakthrough, for learning continued normally for the regular students irrespective of the lockdowns and frequent learning suspensions by the government.

Online Learning for Increased Access

At the forefront of kicking off this major shift in learning is the DODL, whose desirable target is to increase access to quality education for all deserving nationals. The current demographic trends, the rising demand for education, and the country's social, technological, and economic dynamics have jointly exerted pressure on Higher Education (HE) in demand for appropriate solutions. Because of this reality, the PNGUoT, through DODL has externalized some of its academic programs (e.g., Bachelor of Business Administration in Accountancy, Bachelor of Business Administration in Applied Economics, Bachelor of Business Administration in Information Technology, Bachelor of Business Administration in Management, Bachelor of Arts in Communication for Development, and Bachelor of Property Studies).

The intention is to respond to the government's directive- of increasing school-leavers' intake by 15%, and also meet the increasing demand for HE of the non-school leavers and other categories like employees who find it hard to pursue university education in person and on a regular basis.

The teaching and learning engagements in these academic streams are exclusively done online, aided by learning management systems, such as Moodle, Google Classroom, Moodle Proctor, and other Web-based video conferencing tools, such as Zoom, Google meet, and Cisco Webex. The enrolment is still low, but given the level of commitment demonstrated by SEM in supporting online education, the sky is the limit.

Strengthening Teaching & Learning Experiences

The Department is resolute in its commitment to strengthening teaching and learning processes. Several developments in this regard have been observed thus; a well-guided curriculum review process for the Matriculation Program, module review, design and development undertakings, active pedagogy training, the inclusion of creative and action-based learning models in the teaching process, training on research-guided teaching and learing, and integration of technology in the teaching and learning process as a strategy to increase efficiency and access. We are cognizant that research, discovery, and access to new knowledge are at the heart of a world-class education. In this regard, the Department is set out to venture into distance education research works as a strategy to open up

our scholarship space to the rest of the world and foster a vibrant community of regionally and internationally acclaimed scholars.

Strengthening Partnership with NDoE

Looking further afield, DODL is pursuing partnerships to create and explore new opportunities, such as the partnership with the National Department of Education (NDoE) to offer new distance-based academic programs for teachers in science (Physics, Biology, and Chemistry), Mathematics, and Information Technology. The curriculum design and development process for these programs is underway and the commencement date maybe 2023. Available reports indicate that most teachers for grades 11 and 12 in science, mathematics and information technology have knowledge and skill gaps. Ignoring this problem may be a daunting enterprise that may adversely affect the calibre of school leavers produced each year.
This Teacher Support Development Project is intended to equip teachers with the necessary skills, knowledge, and attitude that are desirable in strengthening the pre-university learning processes.

New Study Centres for Matriculation Program

As a response call to reach out to various categories of disadvantaged learners, DODL extended its presence in 2021 by approving five more study centres for Matriculation Program. They include; Southern Highlands Teachers College affiliate, Sepik Matriculation Centre franchise, Dregerhaffen TVET Secondary-affiliate, Bougainville Technical College-affiliate, Institute of Continuing and Flexible Education Goroka-franchise, Vanimo Secondary School affiliate, Laiagam Appropriate Technology Centre (LATC)-franchise, Min Community Education Development Services-franchise, Popondetta Study Centre -Franchise, South East Matriculation Centre-franchise, and Gazel Franchise Study Centre-franchise.

Policy Documentation and Procedures

Workplace policies set boundaries and guidelines, shape human behavior, and demand a disciplined cause of action at the workplace. In light of this, the Department of Open and Distance Learning has developed several policies to guide and inform decision-making. They include;
The Certification and Procedure Policy, The Payment Policy for Distance Mode and Residential, The Teaching-Learning & Assessment Policy, and the Deferral, Withdraw & Refund Policy.

Implementation Plan for DODL 2020-2024

Just like 2020, 2021 demanded a new style of doing things in the Department. An Implementation Plan appealing to the Strategic Plan of Unitech 2020-2024 was implemented with measurable and attainable key performance indicators to track progress. This Plan aligns itself to the national and global trends in academia while toning down the University's Philosophy, Vision, and Mission statements. It further provides a clear path with traceable indicators for the Department to follow in its quest for excellence and relevance.

To respond to the need for change, the Plan takes stock of the strength, weaknesses, opportunities, and threats affecting the Department directly and/or indirectly. This Plan also contains a Risk Assessment and Minimization Plan which plays a vital role in alerting the implementers of the possible risks and how to minimize them (converting threats into opportunities) for better results.

Conclusion

The Department of Open and Distance Learning is determined to upgrade its brand name to the expected desired levels as a competitive strategy to keep afloat and relevant in society. The Department has put waste-free operational processes, step by step changes in the modus operandi, and a result-oriented motivating approach aiming to recognize staff with special talents in engineering innovations and initiatives. To this end, I thank the alumni, students, staff, partners, community, and the Senior Executive Management Team for the support accorded to DODL year in and year out.

POSTGRADUATE SCHOOL

The PNG University of Technology (PNGUoT) is the only technological University in PNG and the South Pacific Island Countries, besides Australia and New Zealand. Because of this uniqueness, the PNGUoT is mindful of her special responsibility to produce postgraduates to fulfill PNG and South Pacific Island Countries' human resources demands. Accordingly, the PNGUoT remains committed to promoting a nationally and internationally competitive Postgraduate program and innovative research toward skilled workforce development in PNG for sustainable development across the sectors, including academia. The Postgraduate programs of the University are playing a critical role in this regard by producing 553 graduands, including 24 PhDs, since its inception. In light of the PNGUoT Strategic Plan 2020 – 2024, the PG School aligned its programs through the academic departments.

The PG School is committed to diversifying the PG programs to provide more choices to the students based on the country's needs and access through distance and/or hybrid model program offerings. Currently, 20 PhD, 34 Masters, 3 PG Diploma, and 2 PG Certificate, including 3 Master's programs in distance mode, are available. The University is in the process of introducing more programs in the distance and/or hybrid mode. In 2021, 40 students graduated with various PG degrees, including 3 PhDs.This is the largest PhD cohort to graduate in a single academic year. The graduands also include the pioneering group of five students from the Applied Physics Department in the Master of Technology in Exploration Geophysics program. All the PG students are PNG nationals, except one student from Fiji, under the Building University Links for Action (BULA), scholarship under the EU-funded projects; and one from Nigeria, Africa, who graduated with a Master of Engineering in Mechanical Engineering.

He was a scholar of the Queen Elizabeth Commonwealth Scholarships program of the Associations of the Commonwealth Universities (ACU). The presence of students from different parts of the world provides the students the opportunity to learn from each other beyond classroom teaching to enrich their culture. The PNGUoT is a proud member of ACU. CONGRATULATIONS to all the graduands, and we are proud of them.

Due to globalization, the rapid changes in technologies, and competition, the postgraduate studies/program at the University is a necessity, not a luxury. Postgraduate education and innovative research are the most crucial approaches to remain at the top of knowledge evolution and accelerated technological change. Advanced knowledge, innovative and cutting-edge technologies, and skills are critical elements of a country's sustainable economic growth. The University intends to be the technological knowledge hub to serve the nation for sustainable national development.

The postgraduate studies, research, and innovations go hand in hand. Without research, there will be no innovation and, ultimately, no national development. On the other hand, with research and innovation, the country would have a competitive advantage over other nations.

To better coordinate the outcomes of PG studies, research, innovation, and publications, Postgraduate Committee, Research, and Publication committees are merged into a single committee, the Postgraduate Studies, Research and Innovation Committee (PSR&IC). The PSR&IC had new terms of reference (TORs) that are targeted and robust to fulfill the objectives of the Strategic Plan to build skilled human capacity, empower the youths, reducing the gender gap to achieve Vision 2050 to create a smart, wise, fair, healthy, and happy society. In 2021, the University allocated K507,000 to the PSR&IC to support staff and students' research, conference attendance, etc. This budget was 44% higher than 2020, demonstrating promises to support PG studies, research, and innovation to become a technological knowledge hub. The university academic staff and students are very proactive to attract fund from outside sources.

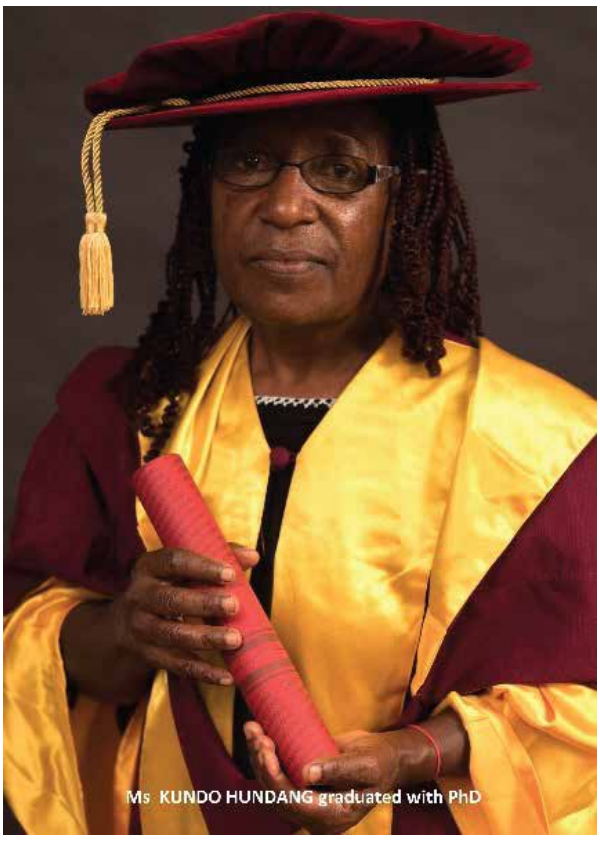
In 2021, Professor Zhaohao Sun, Department of Business Studies, Dr Patrick Michael, Agriculture Department, and Esther Tuweyo Dujambi, an MPhil student at the Applied Sciences Department were recipients of the research funding from the PNG Research, Science and Technology Secretariat.

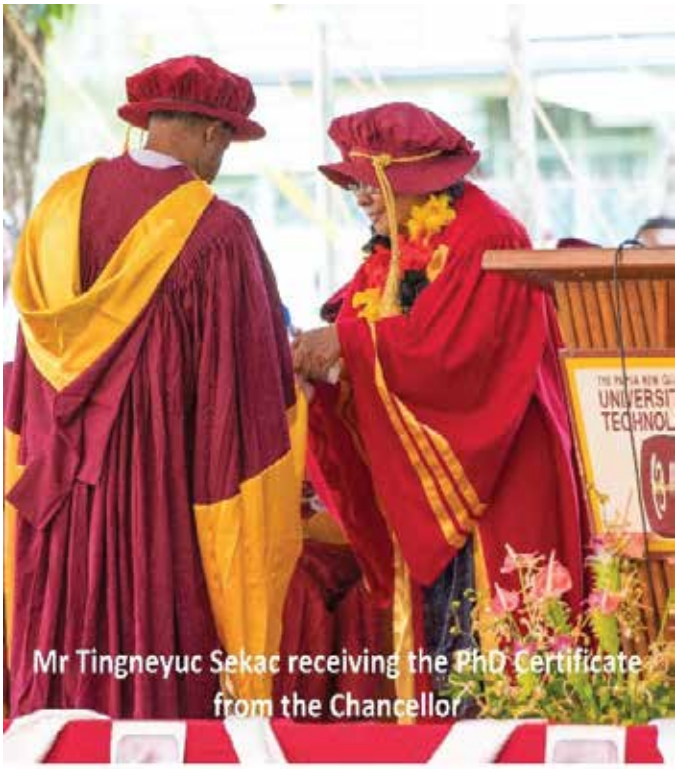
Realizing the importance of innovation and entrepreneurship in sustainable social development, the PSR&IC constituted a sub-committee on Innovation to:

i. Conduct a thorough baseline review and report the current state of research and innovation,

ii. Develop an institutional register and inventory of all patents, copyrights, and notaries on research and innovation, and

iii. Develop a road map and strategic framework for cutting-edge research and innovation, and a plan for leveraging this to provide solutions for society.


Ms KUNDO HUNDANG graduated with PhD


Mr Tingneyuc Sekac receiving the PhD certificate from the Chancellor

Research publications are of immense value to the career of academics. To accelerate academic publications, particularly for encouraging young academics, the Academic Board approved the introduction of a multidisciplinary in-house academic journal. This will operate under an editorial board alongside the other departmental journals. In 2021, staff and students published 89 peer-reviewed journal articles, several book/book chapters, conference presentations, and other publications.

The PG Program was further invigorated since 2005 with the introduction of the Graduate Assistantship Program (GAP) Scholarship Scheme to attract highly talented students to continue their studies at the master's and doctoral levels, and the numbers consistently increased. In 2021, 15 GAP scholarships were awarded to Master's students. Twelve (12) Master's students were also successful in securing loan through Higher Education Loan Program (HELP). The HELP program could be instrumental in strengthen postgraduate studies and research.

The Postgraduate School has been organizing the Annual Postgraduate Research Seminar since 2011 to showcase PG studies and research capabilities, communication and presentation skills, and dissemination of research findings to the broader community, a hallmark of the PNGUoT. Unfortunately, due to COVID-19, in 2021, no research seminar was organized, however, each Academic Department offering the PG programs organized the research seminar at the Department level.

As a part of internationalization, The PNGUoT is a partner to the University of Valladolid, Spain, and the University of Porto, Portugal, under the EU-funded Project ERASMUS-Plus. The PNGUoT also has bilateral agreements with several universities in Australia, India, Japan, China, Fiji, Romania, and Czech Republic for staff/student mobility.

INFORMATION & COMMUNICATION TECHNOLOGY SERVICES

The Department of Information & Communication Technology Services (ICTS) of PNG University of Technology is a unit under the Vice Chancellor's Department. It has big dreams and a vision requiring unlimited enthusiasm to address challenges and foster innovation. The team, therefore, leads the transformation of PNGUoT into an ICT-enabled university through technology-leveraged service delivery, promoting service excellence. The department strives to provide an environment conducive to administration, learning, teaching, and research in the twenty-first century. Above all, the department believes in teamwork to deliver value and excellence to all customers.

Vision

The ICTS Department will provide a feature-rich, integraed, supportable, and secure technological environment giving staff and students seamless, any time, any place, access to the Information Technology resources that support and enhance their activities.

Mission

To offer high-quality ICTS systems and services that support teaching, learning, research, and administration through highly skilled and motivated staff.

Guiding Principles

The ICTS Department is committed to the following set of guiding principles

• The ICTS Department recognizes the strategic importance of information technology and is prepared to invest in the continual development of its IT resources

• The ICTS Department strives for continuous improvement in the area of communication & develops policies and strategies that will govern the use of IT and provide direction on the support of IT resources

• The ICTS Department sees value for money as anessential consideration in all IT investments and will seek to take advantage of economies of scale and solutions that reduce overall support costs wherever possible

• The ICTS Department will implement industrystandards, best practices, and supportable solutions

• The University will promote an ICT Service ethos supported by the most appropriate technology

Major Changes in the ICTS

In 2021, PNGUoT Management appointed a new Director of ICTS, Russell Deka HARADA, from the PNG University of Natural Resources and Environment (PNGUNRE).
Mr Harada was also the team leader of UNI10 after ProVC (Academic), Dr Augustine Moshi retired. In addition, ICT Manager Bill Tomon received a scholarship for his PhD study in India and left duty in July.

Achievements for 2021

There are several achievements this year, despite the lack of human resources and Covid-19 restrictions. This year was challenging to improve service for students and staff, but only a few milestones were achieved. Below, is a summary of our achievements in 2021.

Redundancy Internet Service (Speedcast)

Installation SUSU Campus Internet

• UNI10 implementation and SRS/ORS system operation
• Improve Digicel and Telikom/Bmobile coverage
• Attending National ICT summit and presentation paper (Online) Start to review .pg domain policy Providing Laptops for All New Registered Students Implementation of LAN Upgrading Project (Phase 2.1)Resource (HR and Finance) management Preparing for Online Education in 2022

Problems and Challenges encountered and Recommendations for improvement

In 2021, we have several difficulties and challenges.

* Continues Power Problem
* Primary Internet Link (Dataco OPGW Fibre) cut off and limited access of WiFi Access Point
* HR Management (iChris) and Staff Training
* eLearning (Learning Management System: LMS, Moodle, and Google Classroom)
* Student Management System (UNI10) Error twice, Online Registration and MER Errors (Assessment)

Way forward

Next year (2022), we need to fix the Primary Internet Link with a redundancy connection first, then target to increase the Bandwidth from the current 200Mbps to 500Mbps. LAN Upgrade Project (Phase 2) must complete early next year and move forward to Phase3, which covers all Students Dormitories and Staff Residences with Fibre Cable and WiFi Access Point. With ICTS operation smoothly, we need to recruit more qualified young women and team leaders under our department.

Budget (Revenue and Expenses)

Currently, the ICTS department is a costing centre. We spent a lot of money on Internet connection(s). Also, we purchased some capital items, Student Laptops, and other operational costs, more than a few million Kina we spend every year. In the future, we will make more revenue, primarily from DNS (.pg domain) and ESU (Electrical Service Unit). At this moment, all ICT relative GE (General Expenses) orders must be endorsed by Director, ICTS. However, till, from next year, we will introduce ICT items to Central Procurement Policy and purchase items like Desktop PC, UPS, laptops, Printer, Projector, and other ICT items by the ICTS department and distribute them to the academic and support departments.
Internet Bill, including HoDs CUG Postpaid, Student Data, is the highest amount we spend every year. (Over K1.2mil from April 2021 to December 2021). This is the details of payment for each service provider by each month.
In 2021, we spenta lot of time and money (K45,630.40) for upgrading the LAN Project (Phase II) for the following Academic Department(s).

Department of Business Studies (DBS)
Department of Architecture & Construction Management
Department of Surveying and Land Studies
Department of Communication for Development Studies
Department of Agriculture

Human Resources

Under the ICTS Staff establishment, we have 30x established permanent positions. In April 2021, we occupied 24x Permanent Staff and 3x Temporary staff positionswith a a total number of 27. 5x Permanent Staff position(s) are vacant, 2x positions are moved to other departments (Project office and VC's office).By the end of 2021, the staff number was reduced to to 24x because of retirement, resignation on personal ground and death due to due to sickness. We are in the process of reviewing ICTS staffing structure, so that in 2022 we can recruit fresh, young and energetic Unitech graduate to the ICTS department.

Impact Project ICTS in 2022

In 2022, we have to implement many ICT-related impact-project(s) as below:

• Academic Department(s), LAN Upgrade Project (Phase2.2 to 2.5)
• Digicel 4G Tower Installation
• ORS/SRS and UNI10 migration and implementation
• New Koha Library Server
• Online Education launching Internet access for Kundiawa (SUSU) campus
• .pg domain policy review and do more marketing
• Prepare for the new Open Campus (Port Moresby)
• Set up an ICT SME Incubator Hub
• Lab PC replacement

Conclusion

We acknowledged University management recruited and appointed a new Director. It was a right move to lead the ICTS-related activities. ICTS is the engine room of academic and service activities of the university. We still have outstanding projects to speed up the process to deliver a better Education with ICT Technologies.

RESEARCH CENTRES

UNITECH BIOTECHNOLOGY CENTRE

EXECUTIVE SUMMARY

This report covers research and development work in modern biotechnology that is being undertaken at the UNITECH Biotechnology Centre (UBC). The Centre aims to use biotechnology tools to enhance agricultural production to alleviate poverty and improve livelihoods in Papua New Guinea (PNG). The laboratory facilities are also used for undergraduate and postgraduate teaching and research. The research and development objectives, current and potential research, and developmental opportunities are outlined. Collaborations between Academic Departments and Research Centres of the PNG University of Technology (PNGUoT) and other government Departments and Institutions in research and national issues are highlighted. The UBC Technical Advisory Committee (UTAC) was drawn for deliberation in the first UTAC meeting in 2014. Numerous challenges that should otherwise give UBC a competitive edge in research and development and self-sustenance are acknowledged. They are pivotal in setting the impetus to venture into collaborative R&D projects with various stakeholders such as the Fresh Produce Development Agency and the associated revenue generation activities, the PNG Cocoa Board, the Kokonas Indastri Koporesen, and the Ok Tedi Development Foundation, to name a few.

1. PREAMBLE

The UNITECH Biotechnology Centre (UBC) was estalished by the Council of the Papua New Guinea (PNG)University of Technology (PNGUoT) in 1997 in recognition of the immense role that modern biotechnology could play in contributing to national development. The UBC is housed in the Agriculture Department of the PNGUoT. Administratively, the UBC is governed by a Technical Advisory Committee (UBCTAC),and is managed by the Director, who reports directly to the Head of Agriculture Department and the Deputy Vice Chancellor.

The focus of the UBC is on modern biotechnology. Biotechnology is a broad term for a group of technologies based on applying biological processes. It has diverse applications in medicine, agriculture, food processing, manufacturing, and environmental management. The term "modern biotechnology" is used to distinguish recent,research-based activities from traditional fermentation technologies such as bread, cheese, or beer making, and animal and plant breeding, which were the first examples of biotechnology. Modern biotechnology includes a range of techniques from recombinant DNA technology, molecular and cellular biology, biochemistry, and immunology to information technology. Gene technology is a specific subset of biotechnology based on the manipulation and modification ("recombination") of the genetic material of living organisms to develop new characteristics, processes, and products.Biotechnology is a powerful enabling technology with applications that can revolutionize many industry sectors, including agriculture, forestry, fishing, pharmaceuticals and health, chemicals, textiles, food processing, environmental industries, energy, and mining.

2. VISION

An appropriate vision for the UBC that encompasses the nation's current developmental issues in the face of the changing climate is "to be leaders in the use of agricultural biotechnology to improve livelihoods".

3. MISSION

The UBC strives to accomplish high-quality research, training, and development outcomes with an entrepreneurial characteristic that emphasizes the application of agricultural biotechnology in addressing issues associated with food and livestock production, forestry, and the environment in PNG.

4. ORGANISATIONAL STRUCTURE

The UNITECH Biotechnology Centre (UBC) was estalished by the Council of the Papua New Guinea (PNG) University of Technology (PNGUoT) in 1997 in recognition of the immense role that modern biotechnology could play in contributing to national development. The UBC is a Centre is housed in the Agriculture Department of the PNGUoT. Administratively, the UBC is governed by a Technical Advisory Committee (UBCTAC), and is managed by the Director, who reports directly to the Head of Agriculture Department and the Deputy Vice Chancellor.

5. THE UBC TECHNICAL ADVISORY COMMITTEE (UBCTAC)

As a technical advisory committee, the UBCTAC compries relevant university officials, Centre and Departmental representatives, and representatives from relevant government departments and institutions (Table 1).

Table 1. Current membership to the UNITECH Biotechnology Centre's Technical Advisory Committee

No.	Representative	Department/ Centre/ Institution[a]
1	Dr. Macquin Maino	Chairman-UBC-Committee
2	Prof. Tom Okpul	UBC – A/ Director
3	Prof. Gariba Danbaro	Agriculture Department, PNGUT
	Dr. Ronnie Dotaona	Agriculture Department, PNGUT
4	TBA	ERMC, PNGUT
5	TBA	National Agricultural Research Institute
6	Mr. Elias Taia	Department of Agriculture and Livestock
7	TBA	Conservation & Environment Protection Agency

[a]PNGUT = PNG University of Technology; ERMC = Environmental Research and Management Centre; and UBC = UNITECH Biotechnology Centre.

6. PERSONNEL

The current staff directly engaged at the UBC include the A/ Director, a Senior Technical Officer, and other Departmental staff and postgraduate students (Table 2).

Table 2. List of staff and current postgraduate research students who were directly engaged in research and teaching at the Unitech Biotechnology Centre in 2021

Name	*Position*	*Qualification*	*Research Interest*
Prof. T. Okpul	A/ Director	PhD (UQ)	Plant genetics & breeding
Prof. S. Akanda	Plant Pathologist	PhD (OSU)	Plant pathology
Prof. G. Danbaro	Animal Breeder	PhD (Kobe)	Animal Genetics & breeding
Dr. P. Michael	Crop Physiologist	PhD (UA)	Plant physiology/ environment
Dr. M. Maino	Crop Protection	PhD (PNGUT)	Plant virology/ nematology
Dr. R. Dotaona	Entomologist	PhD (CSU)	Insect pathology
Dr. Gwendolyn Ban	Plant Pathologist	PhD (PNGUT)	Plant pathology
Mrs Totave Kamen	Senior Technical Officer	Diploma	Laboratory management
Ms Melanie Pitiki	Research Officer	MSc.	S/potato weevil bio-control
Ms Emmie Mauligen	Research Officer -FPDA	BTA	Potato micropropagation
Mr. S. Poloma	PhD Student	MSc.	Mycorrhizal symbiosis in rice
Ms Dolla Inapo	MSc. Student	BSc.Ag	Plant Pathology

7. STRATEGIC OBJECTIVES

The strategic objectives that the UBC aims to achieve are:

i) Transfer and develop cutting-edge biotechnologies.

ii) Provide an environment that encourages creativity and investment in the field of biotechnology.

iii) Direct applications of biotechnology to achieve health and food safety.

iv) Use biotechnology to achieve food and health securty.

v) Protect the environmental resources of PNG by deveoping appropriate biotechnology applications and products.

vi) Strengthen the relationship between the biotechnology program and society.

8. SPECIFIC OBJECTIVES

i) To facilitate high quality human development in the field of biotechnology at undergraduate, postgraduate, short courses, and on-the-job training levels;

ii) To facilitate high quality research and provide a conducive environment for institutional collaborations in the fields of microbial, agricultural, forestry, industrial and environmental biotechnology;

iii) To provide quality scientific advisory support to the PNGUT, and the government of PNG on issues about biotechnology and bio-safety; and

iv) To promote and create awareness on biotechnology issues by hosting visits for interested individuals or groups and carrying out educational programs, especially during school visits.

9. FACILITIES AT UBC

i) PLANT TISSUE CULTURE SECTION

This section of the lab can facilitate basic plant tissue culture studies, including micro-propagation, clonal production, mutation studies, support plant breeding research in screening for tolerances to environmental challenges, embryo rescue, and dihaploid production.

ii) PLANT PHYSIOLOGY SECTION
This plant physiology lab can facilitate basic physiological studies. It houses essential equipment helpful in measuring leaf area, water pressure, light intensity, etc. In addition, a plant growth chamber is being fixed for use in controlled environment studies.

iii) MICROBIOLOGY SECTION
All studies on general microbes and those associated with plants are conducted in this section of the lab. It can facilitate microbial cultures (incubators), experiments, and molecular studies.

iv) ENTOMOLOGY SECTION
All studies on a general insect are conducted in this section of the lab. It has the capacity to facilitate insect rearing, experiments, and molecular studies.

v) CONTAINMENT-1 SECTION
This section is a biosafety level-1 facility. It has the capacity to undertake basic nucleic acid (DNA/RNA) assays involved in genotyping, disease diagnosis, paternity testing, gene transformation (gene technology), and gene expression analysis.

The most important equipment required to undertake these molecular tasks include;
thermocycler or polymerase chain reaction machine, electrophoresis apparatus, gel documentation system and accessory computer (yet to acquire), bio-safety cabinet (yet to acquire), fume hood (yet to acquire), Enzyme linked immunosorbant assay reader and accessory computer (yet to be acquired), -20°C freezers, -80°C Freezer (faulty power) and incubators.

vi) FACILITY RENOVATION AT UBC
The renovation work, particularly for ceiling replacement and painting of all walls and the exterior wall has been scoped and is pending the engagement of the contrators.

vii) NEW EQUIPMENT
The Centre acquired a new Autoclave and an incubator through the support of the ACIAR Sweetpotato Weevil project headed by Dr. Ronnie Dotaona.

10. FEASIBLE RESEARCH AREAS

i) Agriculture

a) Disease diagnostics (plant and animal)
b) Pathogen-tested plant production
c) Genotyping and Gene discovery
d) Biodiversity assessment (plant and animal)
e) Germplasm conservation
f) Genetic manipulation (plant)

ii) Forestry

a) Clonal propagation
b) Disease diagnostics
c) Biodiversity assessment
d) Genotyping and Gene discovery.

11. FINANCIAL STATUS

Since the termination of the MOA with the OTDF in 2018, and the last funding received from the Department of Public Enterprise and the FPDA, no other support was established, leading to the account going into the red.

This was overcome by support from two sources:

i) Income generated in 2021:
* Consultancy on East Sepik Province Vanilla Disease survey with FAO-STREIT Program - K22, 000.

ii) Internal-Support funding 2021:
* The Vice Chancellor, A/ Prof. Ora Renagi committed K100, 000 to drive R&D in agricultural biotechnology.

12. CURRENT RESEARCH AND DEVELOPMENT ACTIVITIES

Faced with immediate challenges, especially surrounding accreditation of the laboratory, staffing, and essential equipments, the Centre is taking a proactive approach to addressing these issues while performing its mandated role.

The current and proposed research & development (R&D) opportunities for the UBC (and potential commercial opportunities) cover a broad range of areas,including plant disease diagnostics and biodiversity assessment using DNA-based techniques, pathogen-tested plant production, clonal forestry, and gene discovery.
The Centre's activities to date can be categorised into the following areas:

a) Industry-oriented research and development
b) Student research projects
c) Other research studies
d) National participation in biotechnology-related issues

a) Industry-oriented research and development

i) A collaborative R&D project on the "Development of eaglewood in the Western Province - Ok Tedi Development Foundation (OTDF). Proposed budget: K343,000.00.

Expected outcomes:
* Identification of fungal species infecting eaglewood species in PNG

* Develop fungal inoculum packages for commercialization

* Contribute towards diversifying income generation sources for the rural populace, and

* Discourage harvesting from the wild to conserve this endangered species.

iii) Potato plantlet production – Potato Seed Scheme – Fresh Produce Development Agency.

* Studies on microtuber production in vitro (Fig. 1) have been conducted with initial funding of K50, 000 by FPDA.

* This project will be reviewed this year for continuation into 2023.

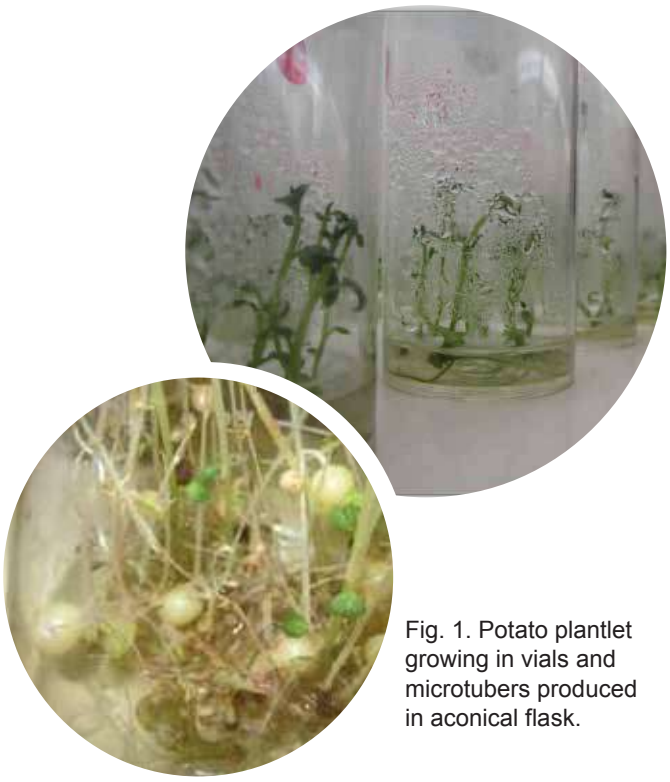


Fig. 1. Potato plantlet growing in vials and microtubers produced in aconical flask.

iv) Genetic Barcoding of the 18 cocoa hybrids released by PNG Cocoa Board (PNGCB. Proposed budget: K30, 000.

Expected outcomes:
* Establish the genetic identity of the selected cocoa hybrids

* Enable PNGCB to register their hybrids.

v) Clonal propagation of coconut. This was one of the proposed areas identified by the Kokonas Indastri Koporesin (KIK) MOU signed in 2021. Preliminary studies are underway and awaiting a call from KIK.

vi) East Sepik Vanilla disease survey – Under the auspice of the FAO-STREIT Program, a survey of vanilla diseases (Fig. 2) infecting vanilla plantations was conducted in three major vanilla growing areas of Maprik, Wosera, and Drekikier, with the funding of K22,000 by FAO STREIT Program.

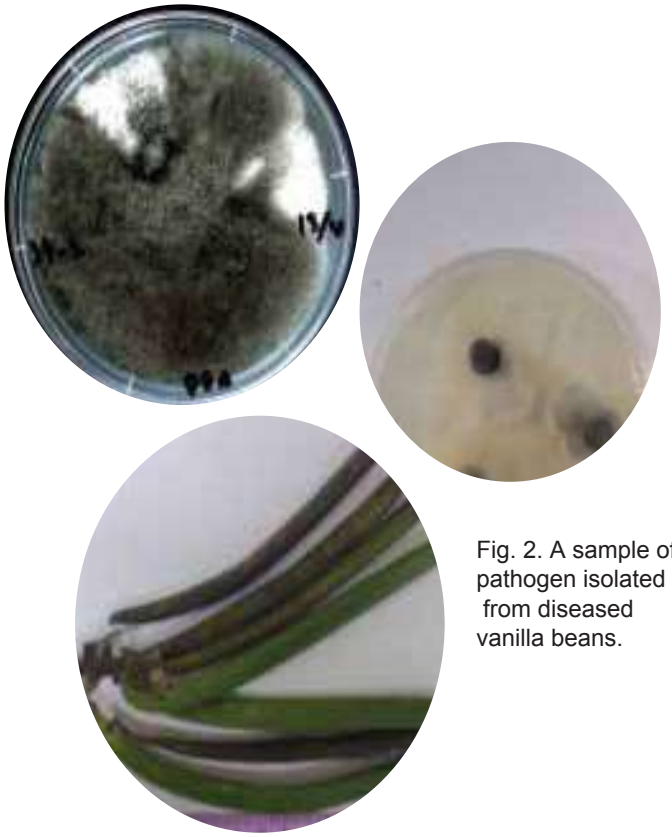


Fig. 2. A sample of pathogen isolated from diseased vanilla beans.

b) Student research projects

Promising research projects conducted by students (Fig. 3) are being conducted at the UBC laboratory with commercial potentials ranging from potential bio-pesticides to genetically modified plants (Table 3). These student projects are supported by various institutions and donor agencies, including the University's Graduate Assistance Program and collaborating stakeholders.

c) Other research studies

Other promising research studies initiated by UBC include:

i) PNG Wild rice germplasm collection. Fifteen accesions of Oryza and Leersia spp. are currently maintained in ceramic pots. A recent collection was conducted with researchers from Hirosaki University in Madang Province,where several wild rice were collected.

ii) Screening for insect resistance in local corn. A popultion of 23 inbred lines is being monitored for the genetic study of the observed resistances.

13. IMMEDIATE CHALLENGES FACING UBC

The immediate challenges facing the UBC include;

i)Accreditation of the laboratory;

ii) Lack of staff (Research and technical) in certain fields of biotechnology; Limited funding support and seed money to establish commercial projects;

iii) Lack of equipment and other facilities. Several equipment and computer software (Table 4) are urgently needed to give the UBC its independence and competitive edge in biotechnology research and development.

iv) Renovation (funded) of the Sir Julius Chan Building will be made to improvise the current setup to cater for an incubation room and staff office spaces and working benches and shelves; and

Fig. 3. Students conducting molecular lab experiments.

Table 3. Current biotechnological research conducted at the UNITECH Biotechnology Centre and potential commercial opportunities

Research topic	Funding source*	Researcher	Commercial opportunity
i) Plant disease diagnosis			
a) Molecular identification for East Sepik Vanilla Disease Survey	EU-STRET Program	Deane Weruba, Melanie Pitiki, Malcolm Kabiwaga, Cybill Polya, Cindy Caleb, Nanda Siri, Rabi and T. Okpul	None
ii) Pathogen tested plant production			
a) Micro-propagation of plantlets and micro-tubers for seed potato production	UBC/ FPDA	Emmie Mauligen, T. Kamen and T. Okpul	High
iii) Biodiversity assessment			
a) Assessing the extent of its genetic diversity *Leersia hexandra* in Papua New Guinea	UBC	Cybill Polya, M. Kabiwaga, R. Manus, Chris Bugajim & T. Okpul	None
iv) Genetic manipulation			
a) Standardizing protocols for rice plant regeneration and transformation	UBC	Cybill Polya and T. Okpul	Long-term
v) Gene and gene product discovery			
a) Identification of gene(s) controlling shattering in the wild rice, *Oryza schlechteri* Pilg.	UBC/PNG Cocoa Board	Cybill Polya and T. Okpul	High
b) Identification of DNA barcodes for elite cocoa lines from Papua New Guinea.	PNGUT-GAP	Gorry Fauro, Melanie Pitiki, M. Kabiwaga, Donald Sogoware, Peter Epaina and T. Okpul	
c) Investigating the use of colloidal nanoparticles as gene carriers to increase the efficiency of gene transfer by particle bombardment	UBC/ Applied Sci. Dept.	Justin Karimbi, Srikanth Bathula and T. Okpul	High
vi) Clonal forestry			
a) Micro-propagation of the eaglewood species, *Aquilaria crassa*.	UBC	M. Kabiwaga and T. Okpul	High
b) Identification of plant pathogens associated with agarwood formation in *Gyrinops federmanii*.	UBC/ DTDF	M. Pitiki, M. Maino, J. Beko and T. Okpul	High
c) Production of fungal inoculum for agarwood formation in *Gyrinops federmanii*.	UBC	M. Kabiwaga, M. Pitiki, M. Maino, J. Beko, K. Mulung and T. Okpul	High
vi) Environmental research			
a) Investigating heavy metals in water, soil, sediment, and plants along the Markham river system and its tributaries.	UBC/ Applied Sci. Dept.	Sogoing Deseno, William Modey and T. Okpul	High
b) Assessing the potential of endemic wild rice species in bioaccumulation of heavy metals, and their use in mitigating environmental pollution from landfills.	UBC/ Applied Sci. Dept.	Sogoing Deseno, William Modey and T. Okpul	
c) Investigating cysteine protease as defense mechanisms of tropical trees against insect herbivores	BRC/GAP	Samson Hege, David Timi, BRC Researchers, T. Okpul	High

*Funding sources: PNGUT-GAP = Papua New Guinea University of Technology – Graduate Assistance Program, AD = Agriculture Department, UBC = UNITECH Biotechnology Centre, BRC = Binatang Research Centre; NARI = National Agricultural Research Institute, EU = European Union, CIC = Coffee Industry Corporation, Private = Self-sponsored student research, FD = Forestry Department, MED = Mining Engineering Department. *Commercial opportunity available to UBC; Proposals refer to projects that are to be undertaken by postgraduate students in 2014.

v) Development of research proposals and training programs.

14. COLLABORATIONS ON CURRENT RESEARCH ACTIVITIES

The numerous researchers from various academic Departments PNGUoT, and other collaborating institutions are involved in the several identified research areas (Table 4). Such collaborators include:

i) Agriculture Department, PNGUoT;
ii) Forestry Department, PNGUoT;
iii) Mining Engineering Department, PNGUoT;
iv) National Agricultural Research Institute (NARI);
v) Fresh Produce Development Agency;
vi) Ok Tedi Development Foundation (OTDF); and
vii) PNG Cocoa Board (PNGCB)
viii) Binatang Research Centre (BRC)
ix) Kokonas Indastri Koporesin (KIK).
x) Hirosaki University, Japan.

15. MAJOR MILESTONE FOR 2022

i) Submission of the UBC Strategy to the Vice Chancelor's Committee.

ii) Complete renovation of the laboratory in preparation for accreditation.

iii) Submission of a funding proposal for laboratory equipment to the Secretary of the Public Enterprise Department as invited.

iv) Finalize the MOA and proposal for collaboration with OTDF on the collaborative partnership on developing eaglewood in Western Province.

v) Participate in developing collaboration with Corteva – a subsidiary of Dow-DuPont.

vi) Continue renovation of the laboratory in preparation for accreditation.

vii) Review the MOA for the extension of collaboration with the Fresh Produce Development Agency on its potato seed scheme.

viii) Finalize collaborations with KIK and PNGCB on coconut clonal propagation and genetic barcoding of the cocoa hybrids, respectively.

16. PARTICIPATION AT THE NATIONAL/ INTERNATIONAL LEVEL

i) Alternate Focal Point for Genetic Modified Organisms (GMO) Issues for PNG through the Department of Agriculture and Livestock to the Food and Agriculture Organisation – T. Okpul

ii) National Bio-safety Committee through the Deparment of Environment and Conservation – on the safe handling of GMOs and products thereof –T. Okpul, M. Maino.

iii) IUCN SSC Crop Wild Relatives Specialist Group (Member, 2021-2025) – T. Okpul.

iv) Niugini Biotechnology Network (Board Member, 2020-) - T. Okpul

17. COMMERCIAL ACTIVITIES

The Centre has the technical capacity to conduct sound consultancies. Our first product is a range of fungal inoclum for agarwood production to support eaglewood cultivation in the country. It will be commercially rolled out in 2022.

18. CONCLUSION

The Centre is focused on turning the challenges it faces into milestones that need to be achieved in 2022 and onwards, to be achieved in 2022 and onwards, and fully equipping the laboratory in the process towards developing an enabling Centre of PNGUT. A Centre that can enable us "to be leaders
in the use of agricultural biotechnology to improve livelihoods" in PNG.

Table 4. Essential equipment listed in order of priority that is needed to be acquired at the UNITECH Biotechnology Centre

Equipment/ Tool	Qty	Use	Supplier	Estimated Cost (K)
1. Tuttnauer Vertical Autoclave	1	Sterilization of equipments	EBOS	70,000
2. NanoDrop	1	Nucleic acid quantification	Thermo Fisher	10,000
3. DNAStar® Software	1	softwares for sequence analysis, bioinformatics	Achema Pte Ltd	6,000
4. Millipore	1	Water sterilisation	Fisher Scientific	12,000
5. Incubator Std 300L	1	Microbial culture	Thermo Fisher	70,000
6. Fume Hood	1	Safe handling of volatile chemicals & gases	Alibaba	15,000
7. Air condition (temperature controlled)	2	Tissue culture growth room environment	Local	6,000
8. Tissue culture racks	6	Tissue culture	Alibaba	20,000
9. Real Time Thermal Cycler		Quantitative PCR	BioRad	30,000
10. ELISA reader		Virus testing	EMax Devices	15,000
11. Computer sets	2	RT-PCR and Gel Doc system	Datec	10,000
Total				**264,000**

SOUTH PACIFIC INSTITUTE OF SUSTAINABLE AGRICULTURE AND RURAL DEVELOPMENT (SPISARD)

Brief introduction

The South Pacific Institute of Sustainable Agriculture and Rural Development (SPISARD) has been operating for almost 18 years. For the last 7 years, SPISARD was unable to conduct research and outreach activities, primarily due to lack of funding and Covid-19 imposed restrictions. This year (2021), the Vice-Chancellor through the University allocated K100, 000.00 to SPISARD to carry out its outreach activities. With this funding, several SPISARD program activities were conducted, as highlighted below.

1. Activities Conducted

1.1. Preliminary Observations

Two (2) preliminary observations were conducted to identify the training needs of the target populations in Kuli Gap, Jiwaka Province, Kompri, Eastern Highlands Province, and Kapari Village in Central Province.

1.1.1. Kuli Gap Village

No preliminary observation was conducted at Kuli Gap before the life skill training was conducated. However, the information presented was collected through observation when the officers were on the ground to deliver the training. Kuli Gap is situated at the border of Jiwaka and Western Highlands Province. The village has education facilities (elementary school to high school), a church, access to electricity and water from streams, and groundwater. Villagers earn their income from coffee and food gardens, especially sweet potatoes.

1.1.2. Kompri Village

The Kompri area in the EHP is notorious for law-and-order problems. As a result, SPISARD felt the need to reach out to this particular community with the anticipation that the presence of the University of Technology in the community through SPISARD's outreach program would evoke a sense of value and inclusion among the inhabitants of this community. A baseline study was conducted to identify community training needs, resource availability, and establishing a working committee. Due to Covid-19 restrictions in 2021, SPISARD was unable to conduct need-based training in the area.

1.1.3. Kapari Village

The second preliminary observation was conducted in Kapari village, Central Province. This baseline study was conducted to identify the potential for cocoa development, and establish cocoa development requirements and other associated needs regarding the development of cocoa farming in Kapari.

1.2. Training Activities

Two (2) training were conducted, one at Kuli Gap, Jiwaka Province, and the other at Kapari, Central Province, in 2021. Although SPISARD planned to run six (6) training annually, it conducted only two training. This happened because members of the SPISARD team were also the teaching staff of the Agriculture Department. They were tied up with teaching responsibilities with little time to complete the planned training programs.

1.2.1. Kuli Gap Life Skill Training

The Life Skill Training in Kuli Gap was conducted in July 2021. About 120 participants attended the training. The Training was on stock feed making, soap making, floral arrangements, and drape decoration.

1.2.2. Kapari Cocoa Nursery Training

The Kapari Cocoa Nursery Training was conducted in December 2021. About 69 participants attended the training. The Training was on cocoa nursery and soap making. The Training participants acknowledged the initiative of Kapari Development Corporation in introducing and developing cocoa farming in the area.

1.3. Infrastructure Development

A Resource Centre is currently being built in Popondetta, Oro Province, by the people of Kokoda LLG (Ward 14). The community funded and built the Resource Centre. This reflects the community's desire for change. To motivate continued participation, SPISARD assisted funding roofing irons for the building. The Resource Centre is likely to be completed in 2022 and opened in October of the same year.

1.4. Agriculture Development

In the same period, cocoa development projects have been started in Kapari Central Province. The project will assist households in Kapari in setting up their cocoa blocks. The project is facilitated by SPISARD and Kapari Development Corporation (KDC).

2. Training Evaluation

2.1. Kuli Gap Life Skill Training

Pre- and post-training evaluations were conducted before and after the training. A follow-up study is yet to be undertaken. Surveys were conducted during and after graduation to get participants' feedback on the training.

A. Pre-training evaluation

3.1.1. Extent of knowledge on training subjects.

Figure 1. Graph showing participants' extent of knowledge about the training subjects (n=118)

Ninety-five percent (118 participants) participated in the pre-training evaluation survey, while 96 % (119 participants) participated in the post-training evaluation survey.

• Almost 100 % of the participants did not know about stock feed making, soap making (bath and dish soap), floral arrangement, and drapery.

• Eleven percent of the participants had moderate knowledge about the floral arrangement. These participants were primarily women who actively participated in church decorations in preparation for church gatherings.

3.1.2. Previous training on training subjects

Figure 2. Graph showing participants' previous training on training subjects (n=118)

• Almost 100 percent of the participants had no previous training in stock feed making, soap making (bath and dish soap), floral arrangement, and drapery.

3.1.3. Participants' expectations for the training.

Table 1. Participants' expectation for the training (n = 118)

Responses (interested to learn about)	Percentage (%) of participants
Stockfeed	22
Stockfeed + Soap	18
Stockfeed + Soap + Floral Arrangement + Drapery	30
Stockfeed + Soap + Floral Arrangement	11
Stockfeed + Floral Arrangement + Drapery	3
Stockfeed + Floral Arrangement	4
Floral Arrangement + Drapery	5
Soap + Flower arrangement	1
soap + Flower arrangement + drapery	2
Soap	3
Others	1

• Most participants were interested in learning about one training subject or a combination of the training according to their interests and how they perceive the training will or will not serve them.

• From the table above, the highest number of particpants (30 %) ere interested in all four training subjects (i.e.,stock feed, soap, floral arrangement, and drapery), 22 % were interested in Stockfeed, and 18 % were interested in Stockfeed and soap.

B. Post-training evaluation

3.1.4. Participants' opinion on the delivery of training subjects.

Table 2. Participants' opinion about the delivery training (n=119)

Topic	Percentage (%) of participants			
	Simple and easy to understand	Moderate (sometimes easy and sometimes hard)	Hard to understand	Missing data
Stock feed	88	9	1	2
Bath soap	76	17	3	4
Dish soap	92	1		7
Floral arrangement	47	33	7	13
Drapery	47	30	9	14

• The majority of the participants found stock feed making (88 %), bath soap (76 %), and dish soap (92 %) to be simple and easy to understand.
• The results were expected because you're just measuring ingredients and mixing them up, and you're done.
• Almost 50 % found the delivery of floral arrangements simple and easy to understand and 30 % – 33 % found it moderate. Some found it hard to comprehend floral arrangement and drapery. Those who found it difficult to understand the training mainly were male participants. The missing data were from primarily male participants, as observed in their lack of interest in the subject.
• All training required ample time for participants to fully understand

3.1.5. Participants' opinion on the usefulness of the training

Table 3. Participants' opinion on the usefulness of the training (n=119)

Topic	Percentage (%) of participants			
	Not useful	Useful	Very useful	Missing data
Stock feed		5	92	3
Bath soap	1	20	76	3
Dish soap		9	85	6
Floral arrangement	1	17	68	14
Drapery	3	21	63	13

• The majority of the participants found the training to be very useful

• The missing data were from male participants who were not interested in floral arrangement and drapery training.

3.1.6. Participants' opinion on the timing of the training

Table 4. Participants' opinion on the timing of the delivery of training (n=119)

Topic	Percentage (%) of participants			
	Too short	Good timing	Too long	Missing data
Stockfeed	20	80		
Bath soap	13	64	17	6
Dish soap	17	75	2	6
Floral arrangement	17	60	8	15
Drapery	17	62	8	13

•The majority of the participants think that the time taken to deliver the training was good.3.1.7. Participants' level of confidence in putting to practice what they learned

Table 5. Participants' confidence level (n =119)

Topic	Percentage (%) of participants			
	No, I need further training	Not confident	Yes	Missing data
Stock feed	6	3	90	1
Bath soap	6	11	81	2
Dish soap	3	4	83	10
Floral arrangement	9	11	66	14
Drapery	9	17	60	14

• The majority of the participants were confident about putting to practice what they had learned.

• A small number of the participants were not entirely confident about practicing what they had learned.

3.1.8. Participants' satisfaction with the training

Figure 3. Graph showing participants' satisfaction level (n=119)

• Seventy-two percent of the participants were fullysatisfied with the training, while 11 % were moderately satisfied
• Only a small number of participants were not satisfied with the training

3.1.9. Participants' training interests

Figure 4. Graph showing participants' other training interests (n=119)

A. Pre-training evaluation
3.2.1. Extent of knowledge on training subjects.

All of the participants didn't have any knowledge of soap making or cocoa nursery. Understandably, cocoa is a new crop that was introduced to the community.

• The majority (30 %) of the participants did not indicate what other training they would be interested in participating in.
• Twenty-eight percent of the participants indicated they would be interested in learning home economics skills.These participants were primarily women and some men.
• Some were interested in receiving training in crop (13 %) and animal (14 %) production. It was noted that all training participants from Kudjip were fish farmers. They were initially informed that the training was on fish farming. However, they were pleased to attend the training and hoped that similar training would be conducted on fish farming.

2.2. Kapari Cocoa Nursery Training

Like the life skill training conducted in Kuli Gap, pre- and post-training evaluations were conducted before and after the training. However, a follow-up study is yet to be conducted to determine if the participants are putting to practice the knowledge and skills they acquired from the training, especially in soap making. For the cocoa nursery, it is anticipated that all the participants will implement what they learned as they all work together to establish the cocoa nursery, which will supply the needed seedlings to plant in their cocoa blocks.

Figure 5. Graph showing participants' extent of knowledge about the training subjects.

3.2.2. Previous training on training subjects
None of the participants attended previous soap-making training and cocoa nursery training.

Figure 6. Graph showing participants' previous training on training subjects.

3.2.3. Participants' expectations for the training.
All of the participants' expectation was to learn about cocoa and know how to grow cocoa.

B. Post-training evaluation

3.2.4. Participants' opinion on the delivery of training subjects.

The majority of the participants stated that both pieces of training were easy to understand.

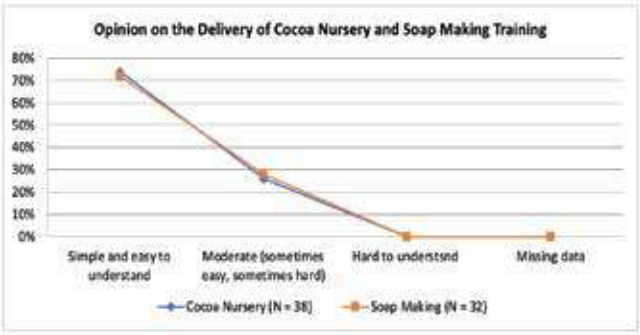


Figure 7. Graph showing participants' opinions on the delivery of the training.

3.2.5. Participants' opinion on the usefulness of the training

Most of the farmers stated that both pieces of training were very useful. Cocoa nursery training was conducted to prepare the participants for establishing the cocoa nursery in Meithe village.The soap-making training was also noted to be beneficial because one of the most basic needs among the participants is soap. Soap is used explicitly for laundry. However, the trainer only prepared training material for bath soap. At the end of the training, the participants requested training in laundry soap making and powder.

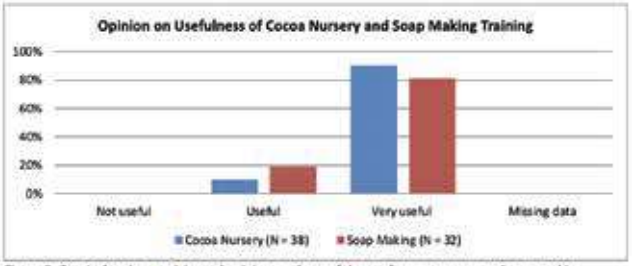


Figure 8. Graph showing participants' opinion on the usefulness of cocoa nursery and soap-making training.

3.2.6. Participants' opinion on the timing of the training
The majority of the farmers stated that the time taken to deliver the training was good.

Figure 9. Graph showing the opinion of participants on the timing of cocoa nursery and soap-making training.

3.2.7. Participants' opinion on whether the training met their expectations or not Since the training was simple and easy to understand, the participants stated that it met their expectations. They were happy that they learned how to fill poly bags with soil and line them up in rows.
They were also happy they learned how to make soap.

Figure 10. Graph showing the participant's satisfaction of the training.

3.2.8. Achievement of Training Objectives
A hundred percent of the participants stated that they had achieved the objectives of coco nursery training, and 91 % said the same for soap-making training.

Figure 11. Graph showing participant's opinion about the achievement of training objectives.

3.2.9. Participants' other training needs
The following table shows training needs indicated by participants who attended cocoa nursery training. The two primary trainingneeds indicated were seed germination and cocoa block establishment. This data indicates that the participants are eager to get the cocoa project running.

Table 6. Training needs as indicated by participants who attended cocoa nursery training.

Training Needs	Number of Participants
Seed germination	9
Poultry	2
Piggery	2
Food processing	3
Create hybrid clones	2
Cocoa block establishment	8
Scent for soap making	4
Butter making	1
Sugar making	5
Dishwashing paste	1
Rice farming	1
Vegetable farming	1
Fish farming	2
Other	7

3. Financial Report

In April 2021, the University allocated K100, 000.00 to SPISARD. The following table shows the break-up of the K100, 000.00.

Table 7. Break-up of K100, 000.00 allocated to SPISARD

No	Activity	Cost
1	Kuli Gap Life Skill Training	K13, 108.09
2	Kompri Baseline Survey	K1, 950.00
3	Kapari Baseline Survey	K2, 957.70
4	Kapari Cocoa Nursery Training	K26, 677.05
5	SPISARD Uniforms	K2, 197.34
6	Camera	K3, 253.90
7	Petty Cash	K500.00
8	Consultant Payment SPISARD Model House	K3,000.00
9	Balance	K53,644.08

4. Conclusion

Finally, we sincerely acknowledge the University's funding support decision to SPISARD's outreach programs. This is one of the most important programs of PNGUoT to help the rural people to improve their life styles.

Background

The Appropriate Technology & Community Development Institute (ATCDI) was initially established in 1978 within the Papua New Guinea University of Technology as a self-supporting community service-oriented and technical consulting unit.
In its early years, it was known as the Appropriate Technology Development Unit. (ATDU) and later changed to an institute (ATCDI) in 1981. It was engaged in developing and adopting new technologies to improve the quality of life within PNG communities.

In consultation and collaboration with government institutions, non-government organizations, community groups, and donor agencies, it carries out research and development on suitable tools and techniques to address rural development needs.
It also disseminates information on developing technologies to communities and organizations both within and outside of Papua New Guinea.

APPROPRIATE TECHNOLOGY & COMMUNITY DEVELOPMENT INSTITUTE

Visions, Missions, and Values

ATCDI's Vision is to be a leading institute in the country, providing innovative community development services to local communities in Papua New Guinea. Our Mission is to help improve the livelihoods of communities through research, development, application, and dissemination of technology and information. ATCDI's core values are service to the community, and in particular, those communities less serviced by the government and in remote rural areas. ATCDI also values the application and sharing of appropriate skills and knowledge through training and technology and information disseminationto address the needs of the local communities.

The Institute, therefore, aims to:

1. Encourage and assist rural development in Papua New Guinea in a culturally sensitive and sustainable manner;

2. Conduct research and development into technologies and tools that can be adapted to improve the living conditions of communities in Papua New Guinea;

3. Disseminate information on appropriate technologies and general development issues through publications and other media.

4. Offer training to local communities and development workers.

Consistent with the mission and Vision of the PNG University of Technology, ATCDI is focused on five work program areas covering Appropriate Technology, Downstream and Food Processing, Energy, Water Supply, and Community Development Information.

ATCDI New Building and Staffing

Our new building has been fully occupied by staff since the third quarter of 2021. Some corrective maintenance was done on the roofing, walls, and floors. The Vice Chancellor's office provided extra funding for the purchase and installation of air conditioners in the offices. At the end of 2021, Director Mr Andrew Puy's term of employment with ATCDI ended. The Secretary/Admin officer also resigned earlier in the last quarter of the year. The position of Secretary and Admin Officer have been filled. Vacancies now exist for a qualified Director/Engineer and an Energy Engineer who is acquainted with facets of power harnessing and energy systems.

Program Activities in 2021

NARI Galip Nut Depulper and Nutcracker

The former director, Mr Andrew Puy designed and built a Galip nut depulping machine at the ATCDI's workshop. After several trials and modifications, the device was presented to NARI officials on the 28th of July 2021. The machine was later shipped to NARI Keravat ENB in November 2021.

Charcoal Kiln

A charcoal Kiln built in 2000 by ATCDI for a local charcoal maker had deteriorated to an unusable state. The Owner requested the kiln's drawing so he could seek costing from a fabricator with the facilities to build another one to enable him to restart his SME business again.

Ram Pump Technology

The ram pump is an effective technology yet to be utilized fully in communities with abundant running water. Ram pump research and projects have been carried out in the past by ATCDI, Civil and Mechanical Engineering Departments. The Appropriate Technology program is revisiting the ram pump technology because of the need for sustainable low-cost technology that can be built andmanaged by rural communities. ATCDI and the Civil Engineering department are carrying out a performance test on an imported billabong ram pump with a locally built one. Results showed that the locally made ram pump required some adjustments on the rig component.

An engineer testing a ram pump

Biosand Filtration Unit

Biosand filter design has been disseminated successfully in many parts of Asian and African countries. However, very little research has been done in PNG.
The Appropriate Technology program plans to fabricate a mould to make the biosand filter. , The initial budget for the construction, has been made, and it will be part of the University's community-funded project.

Brick Mould Making

Brick mould making and disseminating information on brick making has been an ongoing activity. The Buimo Correctional Services had been engaging ATCDIs Small Industries engineer to run training for would-be released prisoners at the Buimo Jail.

Brick-making training at Buimo Jail

Faseu Micro Hydro program

Faseu Micro-hydro Project located in Finchafen district, Morobe Province went through rehabilitation work on the transformer. Power was restored to the Faseu community.

UNDP SERI/TERI East Sepik Province Energy Project

Seven sites have been accepted, and a ToR is being drawn up for the construction of these projects.

Gobadick Pico Hydro Installation and Testing

Gobadick Community is located in the Nawaeb District in Morobe Province A 2kW Pico Hydro turbine was tested for generating lighting for a family. Further testing is ongoing. Funding of this project was provided through the University's community funding.

A Kaplan Pico hydro turbine used at Gobadic

A2MV Sola Design

This project is being carried out through SERI for MP Maru. The proposal was submitted in October 2021.

Other Studies

• Hydro Feasibility Study in Henganofi, EHP.
A budget was submitted for the study, but funding has been pending.

• Lake Tris Hydro Study
Funding was received, and a survey was conducetd at the lake on the 28th October, 2021.

• Busu Hydro Study Report
A report was prepared and submitted to the Morobe Provincial Government Administrator and is pending presentation.

The program engineer was involved in the external supervision of Mechanical and Civil Engineering students in September and October, respectively. Energy Program senior engineer Mr Nosare Maika has been awarded an Engineering Australian Award Scholarship in 2022. He will be attending James Cook University to do his PhD study in Mechanical engineering. Under this award, a proposal is submitted to setup an Energy assimilation laboratory at Unitech A paper titled "Implementing Gravitational Vortex Hydro Power Plant: A Case Study, has been accepted for publication in August 2021 in the Springer Journal, a Journal publication of the Institute of Engineering - India

Water Supply and Sanitation

This WASH program to improve community life by building and improving water supply and sanitation facilities in communities through technical assistance and training provisions.
Over the years, ATCDI has been involved in many water supply projects in many parts of the country. Community water systems that have been investigated and installed included shallow water wells ground water, deep wells, surface water intake, gravity feed water supplies, solar pumps, hydraulics ram pumps, rain water harvesting and construction of Ferro- cement tanks.
In 2021 the program engineer was involved in feasibility studies of four locations around Morobe Province and one in Abau District in the Central Province, which was funded by the university community funding. The studies in Morobe include Wampar Primary School water facility in the Huon District. In addition, a rescoping of the Markham Valley High School water facilities and the Nuknuk Water Supply system in Salamaua in the Huon Gulf District, These project was funded by the Morobe Provincial Government.

Liaising with Nuknuk community

The Sagup community water supply in the Muzing has been temporally put on hold due to waning interest by the leader who instigated the project.

Downstream & Food Processing Programme

• Soap Making: The program officer was involved in conducting soap making training workshop in Yawasoro Wewak in June 2021. A follow-up reflection workshop was carried out in November. The program was funded by Water Aid PNG for the Wewak Council of Women. The training aligns with the concept of personal hygiene and cleanliness amidst the Covid outbreak. More than 50 women and youths, including males, attended the training. Apart from making soap using the cold process method, they also made hair cream, toothpaste, and dishwashing cleaners. The training was extended to three other communities in the SoWom area close to the border of West Sepik

Participants at the soap making training

• Baking training has been popular among women and youth groups around Lae urban and suburban areas. It has helped provide varieties of baked goods for families and helps them in the informal sector income generation activities.

• Downstream processing of Turmeric Powder, Virgin Coconut Oil, and a variety of Noni Products has been ongoing

Displayed are some products produced and sold at ATCDIs Food Centre. These include fresh Noni Juice, Noni NutradDrink, Noni Seed Powder, Turmeric powder, Virgin Coconut Oil and Noni soap..

Community Development Information Program

Sales of Liklik Buk and Save Na Mekim were ongoing but at a slow pace compared to previous years. Awareness will be carried in schools and communities on the usefulness of the information produced in the books. The English and Pidgin versions are valuable resource books for community life and development projects.

AGRICULTURE FARM

Introduction

The farm is one of the pillars of the Department of Agriculture and has a land area of 39 hectares. The main functions are to provide physical and financial data on various farming activities for teaching, demonstration, and research, materials (e.g., land, crops, livestock, machinery) for demonstration and practical training in agricultural techniques, facilities for research and development work by the University staff and students, and the opportunity for the students to have an active and intimate association over a period of time with a farming situation.

Staffing and operations

A Manager manages all the farm operations with the support of an admin clerk, three technical officers (livestock, crop, and research and teaching), and 20 field staff. Out of these, there is a driver, a carpenter, and a mechanic, and the rest are field workers. The farm has two main sections – teaching and research, and the commercial. Most of the teaching and research activities are conducted by staff and students and coordinated by a designated farm staff (Research and Development Officer). The commercial section includes livestock (cattle, sheep, goats, pigs, ducks, layer birds, and meat birds, respectively) and crops (annual and perennial crops). All the sections are managed by a technical officer, and the general labor force is used for the respective production activities.

Infrastructure

The farm facilities include an office complex that houses the offices of the technical officers and the farm admin. The livestock section has a number of sheds: hog breeder and weaner, two broiler production, a layer bird, and duck. In addition, there is a feed storage facility, slaughter shed, and an animal feed mill (newly built and yet to be commissioned). The livestock production and management system is supported by a number of paddocks fenced to separate the stocking rates. The crop section has 18 ha of land under crop, a cocoa nursery capable of holding 3 000 seedlings at anyone time, cocoa bean fermenting and drying facilities, and facilities for raising seedlings of field crops. This section as cocoa blocks, oil palm, rubber, coconut and vanilla. These facilities are open to student and staff research, training and extension, and demonstration to students, the public, and farmers. In addition, two staff houses, 2 x 2000 meat bird sheds, and renovation of the slaughter shed have been submitted as PIP Projects.

Farm Productivity

The farm has the potential to generate income provided managed well. However, a 2015 audit report showed This was the result of sales being conducted by anyone every day anywhere and was not properly coordinated, associated with chronic absenteeism from work. StaStarting early 2016, corrective measures were taken, and several staff implicated were terminated, others disciplined or internally transferred. A salesman was appointed, and sales are only allowed to be done on Tuesday and Thursday each week. Things to be sold on Tuesday are documented and priced on Monday; similarly, the same is done for Thursday's sales. The salesman produces a week's sales report on Friday. In early 2017, the farm account was cleared, and end of that year made its first profit of over K50,000.00, and since then, was making a profit. More than K500,000.00 was generated in the last five years. Prudent management of staff attendance by a way of keeping a logbook resulted in increased productivity and reduced absenteeism. The farm book is in order with a positive balance sheet each year.

Research and Training

The farm conducts its research for development in livestock and crop production and is ongoing. All staff and student research are conducted on the farm, including class practicals. Each year, more than 100 practicals related to undergraduate classes, projects, and visits. Postgraduate students do most of their studies on the farm. The publicity of research and training includes the graduation of all the students involved and publications in low to medium-impact journals.

Extension and Community Services

The provision of extension services to the wider community is a mandatory function of the farm. The farm conducts training in basic livestock and crop husbandry on-site and around the country. Widely requested training is in cocoa production related activities and livestock production. As part of its extension services, the farm participates in annual agricultural shows, seminars, and field days, such as Morobe Agriculture Show and NARI field day. In addition, the farm opens its doors to the public during events like Career Fair and Open Day, where secondary, high, and primary school students are allowed to visit the farm and get a glimpse of what is done in livestock and crop production. Even kindergarten children visit the farm with their teachers during their field excursions.

Future Plans for Development

The farm has the potential to generate income significantly if appropriately managed and staff productivity is enhanced through recruitment and training. Recently, two technical officers were recruited and under probation for research, development, and crop production. Six more additional field staff were recruited, in addition to 8 older staff. Managing these staff strengths and utilizing them is important. The newly built animal feed mill needs to be commissioned and operatedd to make feed for farm use and sell to farmers. There is a demand for cattle, goat, and sheep meat, and to meet these, a number of feedlots need to be built on the excess land that is available. There is enough land for use to grow annual and easy-to-grow crops, enough for everyone, including the student mess. A PIP Project of 30, 000 seedling capacity nursery was submitted, and that plan is underway.

Financial Management:

Finance is the backbone for the success of the organization. Unitech's Financial Management is doing exceptionally well under the direction of the Finance and General-Purposes Committee and the goal set in the Council per Strategy. Our Financial Strategy is "Financial Sustainability. The Management has established an effective internal control system to have better financial position of the University. The annual financial plan, budget, and target have been set and approved by the Council for smooth flow of operations. Unitech policies guide the Management and Bursary team to successfully manage the financial well under the leadership of Chancellor Dame Jean Kekedo.

Liquidity:

Unitech has faced a financial crisis and liquidity cash. Unitech has overcome the issues and managed the balanced budget and turned into operational cash surplus through removing the wasteful activities, reviewed the service contracts and other cost-saving mechanisms, and also improved Government Budget support. Unitech has a good liquidity position as compared to prior years, and Unitech can able to invest a considerable amount in improving the laboratories, maintaining facilities, and fleet management. Furthermore, the Management is looking to invest in the construction of the male dormitory to cater for the demand of the corporate, self-sponsored, and international students.

Accreditation Equipment and Lab Equipment:

Unitech allocated K 7.3 million for international accreditation of the engineering programs and donors supported K2.37 million for the last three years. K7.32 million has been invested in the accreditation equipment and related activities. As a result, Unitech has the provisional accreditation certificate and is working towards full accreditation. Also, Unitech is making efforts to accredit the Business studies courses through CPA-PNG.

Revaluation of Properties:

Unitech appointed the outside valuer for the valuation of the University properties. The Professional Valuer has valued the Admin and Academic Buildings and submitted the valuation reports. Hence Unitech's Net-worth has increased by K307.25 million, and our Balance Sheet has become a very positive position.

Tax Liabilities & Penalty:

Unitech has huge outstanding salaries and wages tax liabilities of previous years due to insufficient Government Budget Appropriation towards salaries and allowances. Council and the Management are making a lot of efforts to meet with IRC and Government Departments to clear the carryover ax issues. The Government Budget allocation has been improved since 2020; hence Unitech is prompt in paying current salaries and wages tax.

Donor Funding:

Unitech is receiving the Donor fund for research, improving facilities, and overseas scholarships for the staff for overseas studies. Most importantly, Unitech has received K15 million from Incentive Fund – Australia for the construction of Female Dormitories. It is the most outstanding achievement of good governance of Council and Management. We have better Financial Management, and our Accounts are audited. The contract has been awarded to start the work.

Financial Highlights

Income Statement:

	2021 K	2020 K
INCOME		
Government Grants	73.67	74.45
DHERST Subsidy	3.75	5.65
Student Fees	22.87	22.16
Other Income	5.84	5.64
Gross Profit from Commercial Activities	2.99	3.56
Total Income	109.13	111.46
EXPENDITURE		
Employment costs	67.62	66.60
Operating Expenses	31.85	31.36
Other Operating Expenses	2.20	1.70
Depreciation Expense	11.35	11.05
Total Expenditure	113.01	110.71
Deficit/Surplus after Depreciation	(3.89)	0.75
Cash surplus from operation	7.46	11.80
No of Registered Student	3,238	2,956
Cost per Student	34,902	37,452
No of Established Staff	977	977
Employees Cost per Staff	69,208	68,164

Statement of financial position:

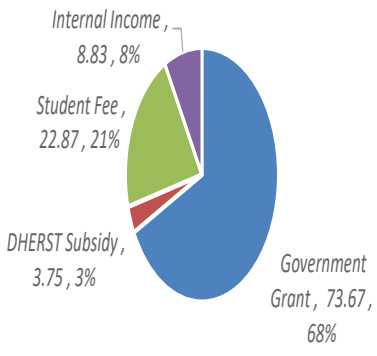
	2021 K	2020 K
ASSETS		
Current Assets		
Cash and Cash Equivalents	46.71	45.02
Interest bearing deposit	6.89	6.79
Trade and other receivables	2.83	1.62
Inventory	0.92	0.74
Total Current Assets	57.35	54.17
Non-Current Assets		
Property, Plant and Equipment	441.33	443.62
TOTAL ASSETS	498.68	497.79
LIABILITIES		
Current Liabilities		
Trade Creditors	12.33	12.23
Other Payables	3.51	3.22
Group Tax Payable	2.40	2.40
Employee Provision	7.41	7.30
Total Current Liabilities	25.64	25.15
Non-Current Liabilities		
Deferred Income	65.17	59.17
Employee Provision	11.91	10.97
Group Tax Payable	143.26	145.36
Total Non-Current Liabilities	220.35	215.51
TOTAL LIABILITIES	245.98	240.65
NET ASSETS	252.69	257.13
EQUITY		
Accumulated Deficit	(139.86)	(135.42)
Asset Revaluation Reserve	384.25	384.25
Captal Reserves	8.31	8.31
TOTAL EQUITY	252.69	257.13

Cash Flow Statement:

	2021 K	2020 K
Cash Balance as of 01.01.2021	51.81	35.56
Add:		
Grant Received	73.67	71.66
DHERST Subsidy	3.75	5.65
PIP Grant received	6.00	8.50
Cash Received from Debtors	33.90	35.78
	169.13	157.14
Less:		
Salary payment	(52.81)	(50.31)
Payment of Salaries & Wages Tax	(14.81)	(14.60)
Paymment of old Tax	(2.60)	(2.20)
Payment to Creditors	(36.26)	(30.67)
Purchase of Assets	(9.06)	(7.55)
	(115.53)	(105.33)
Cash Balance as of 31.12.2021	53.60	51.81

Funding Matrix:

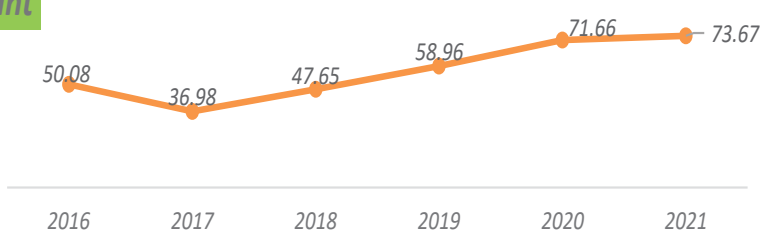
	K	%
Government Grant	73.67	68%
DHERST Subsidy	3.75	3%
Student Fee	22.87	21%
Internal Income	8.83	8%
Total	109.12	



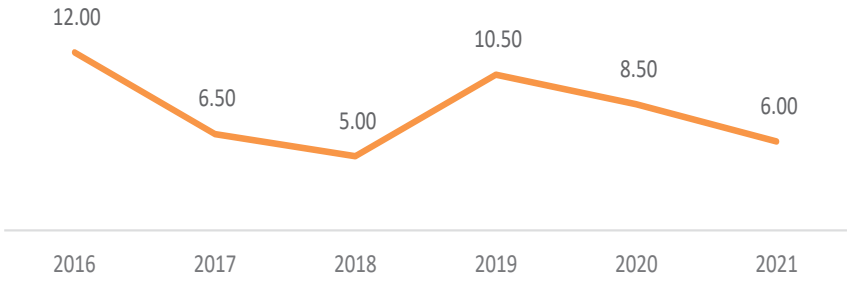
Government Budgetary Support Trend:

	2016	2017	2018	2019	2020	2021
Recurrent Grant	50.08	36.98	47.73	57.96	71.66	73.67
Capital Grant	12.00	6.50	5.00	10.50	8.50	6.00
	62.08	43.48	52.73	68.46	80.16	79.67

Recurrent Grant



PIP Grant



AUDITOR GENERAL'S OFFICE
PAPUA NEW GUINEA

Phone: (+675) 3012200 Fax: (+675) 325 2872 Email: agopng@ago.gov.pg Website: www.ago.gov.pg

Our Reference: 30-11-4

The Honourable Wesley Raminai, MP
Minister for Higher Education, Research, Science and Technology
Office of the Minister
PO Parliament Haus
WAIGANI
National Capital District

INDEPENDEDNT AUDIT REPORT ON THE FINANCIAL STATEMENTS OF *PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY* FOR THE YEAR ENDED 31 DECEMBER 2018

OPINION

In accordance with *Section 8(4)* of the *Audit Act, 1989 (as amended)*, I have audited the financial statements of **Papua New Guinea University of Technology** which comprise the Statement of Financial Position as at **31 December 2018**, Statement of Comprehensive Income, Statement of Changes In Equity, Statement of Cash Flows; and summary of significant accounting policies and other explanatory information.

In my opinion;

(a) the financial statements of Papua New Guinea University of Technology for the year ended 31 December, 2018:

  (i) give a true and fair view of the financial position and the results of its financial performance and cash flows for the year ended on that date; and

  (ii) the financial statements have been presented in accordance with the *Public Finances (Management) Act, 1995 (as amended)*, *International Financial Reporting Standards* and other generally accepted accounting practice in Papua New Guinea;

(b) Proper accounting records have been kept by the University, as far as appears from my examination of those records; and

(c) I have obtained all the information and explanation required.

Level 6
TISA Investment Haus
Kumul Avenue, NCD

PO Box 423
WAIGANI, NCD
Papua New Guinea

BASIS FOR OPINION

I conducted my audit in accordance with *Audit Act 1989* and *International Standards on Auditing*. My responsibilities under those standards are further described in the Auditor-General's responsibilities for the audit of the financial statements section of my report.

I am independent of the Papua New Guinea University of Technology in accordance with the ethical requirements that are relevant to my audit of the financial statements in Papua New Guinea, and I have fulfilled my other ethical responsibilities in accordance with these requirements. I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

Responsibilities of Management and those charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with *International Financial Reporting Standards*, *Section 63(3)* of *Public Finances (Management) Act 1995 (as amended)*, generally accepted accounting practices used in Papua New Guinea and for such internal control as Management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, Management is responsible for assessing the University's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless Management either intends to liquidate the entity or to cease operations, or has no realistic alternative but to do so. Those charged with governance are responsible for overseeing the entity's financial reporting process.

Auditor-General's Responsibilities for the Audit of the Financial Statements

My objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes my opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with *International Standards on Auditing* will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with *International Standards on Auditing*, I exercise professional judgment and maintain professional scepticism throughout the audit. I also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.

- Conclude on the appropriateness of Management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the entity's ability to continue as a going concern. If I conclude that a material uncertainty exists, I am required to draw attention in my audit report to the related disclosures in the consolidated financial statements or, if such disclosures are inadequate, to modify my opinion. My conclusions are based on the audit evidence obtained up to the date of my report. However, future events or conditions may cause the entity to cease to continue as a going concern.

- Evaluate the overall presentation and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

I communicate with those charged with governance/management regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that I identify during my audit.

GORDON KEGA MBA, CPA
Auditor-General

1 September, 2021