PAPUA NEW GUINEA
UNIVERSITY OF
TECHNOLOGY

CELEBRATE OUR HISTORY
INSPIRE OUR FUTURE

RESEARCH REPORT 2024

COMPILED AND EDITED BY
PROFESSOR RAJASHEKHAR RAO BK

This Report Contains Concise Information on Postgraduate Training, Research, and Publication Outcomes Achieved in 2024 by the Staff and Students of the Schools, and Centers of Research Excellence of the University

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FOREWORD FROM THE VICE CHANCELLOR

I am delighted to witness that the year 2024 has been a period of enormous progress and transformation for the Papua New Guinea University of Technology (PNGUoT), as we continue to place ourselves further as a national leader in scientific and technological research, innovation, and postgraduate education. In line with our long-term strategic objectives, the University undertook a major academic reorganization that led to renaming former Post graduate School to the Faculty of Postgraduate Studies, Research and Innovation (FoPSR&I). Besides this, two of our key research centres were renamed as Centres of Excellence (Centre of Excellence in Environmental Research and the Centre of Excellence for Biotechnology), reflecting our commitment to conduct research of international quality and solve national developmental challenges.

The University counted 141 postgraduate students studying in 2024 and 18 were sponsored under the University's Graduate Assistance Program. The research and postgraduate theme were "Aspiring Individual and Community Excellence in Research and Innovation". We focused on building research capacity and increasing postgraduate training capabilities through significant investments in research infrastructure. Research work was funded with over K1 million, of which the funds were directed towards equipment, capacity building, and participation in international forums. Our strategies and commitments to research excellences continued to reap benefits. Our research outputs registered an all-time high number, with 121 peer-reviewed journal articles, 12 edited books, 24 book chapters, and 81 conference presentations being delivered. Forty-four students graduated from postgraduate programs, including 3 PhD graduates—a clear evidence of our commitment to the excellence in scholarship.

We were honored to host the 7th Science and Technology Conference, attended by more than 125 delegates across the country and internationally. We welcomed 37 student presentations to the Annual Postgraduate Research Seminar, with strong national research institute support. We also launched the Interdisciplinary Journal of PNGUoT, continuing our scope of scientific information dissemination. Our international presence continues to grow, with two of our overseas students graduating with Master's degrees under the Queen Elizabeth Commonwealth Scholarships (QECS).

PNGUoT will continue to foster innovation, build knowledge, and empower future leaders that will contribute to a climate-smart, healthy and prosperous Papua New Guinea.

Professor Ora Renagi, OL

Vice Chancellor

STATEMENT BY THE CHAIRMAN OF POSTGRADUATE STUDIES, RESEARCH & INNOVATION COMMITTEE

It is with great pleasure that I present this report, highlighting the significant achievements of the Faculty of Postgraduate Studies, Research and Innovation (FoPSRI) at the Papua New Guinea University of Technology in 2024.

This year marked a period of transformation and renewed commitment to excellence in research, innovation, and postgraduate training. The restructuring of the academic organization and the rebranding of the postgraduate school to a faculty reflect our vision to lead national development through higher degree research that is impactful. The contributions of our students, staff, and collaborating institutions—both national and international—have been instrumental in driving academic and research excellence. From a record number of research publications and graduate completions to dynamic seminar series and successful RST conference, 2024 has laid a strong foundation for the years ahead.

I extend my gratitude to all who contributed to these achievements and look forward to continued growth and innovation.

Professor Rajashekhar Rao BK

Chairman of PSR&IC

TERMS OF REFERENCE OF THE POSTGRADUATE STUDIES, RESEARCH AND INNOVATION COMMITTEE (PSR&IC) AND MEMBERSHIP

Responsibilities: The responsibilities of the PSR&IC encompass postgraduate studies, research, and publications. *Specific responsibilities* of the committee are:

1. To formulate or review the postgraduate admission policy of PNGUoT at least once every three years.
2. To vet appointments of supervisors and thesis examiners of each postgraduate student.
3. To consider and approve examination arrangements for each postgraduate program and the results for each student.
4. To organize an annual postgraduate students' research presentation.
5. To ensure compliance of postgraduate programs with the PNG National Qualifications Framework (NQF).
6. To recommend to the Academic Board names of students eligible to graduate with postgraduate qualifications.
7. To formulate or review the research policies of the University at least once every three years.
8. To consider and approve or reject applications for research funding.
9. To consider and approve or reject applications for conference funding.
10. To edit and publish the University's Annual Research Report
11. To consider and approve the objectives of all academic publications produced under the auspices of the university for dissemination beyond the university.
12. To consider and approve the terms of reference of the editorial board for each academic publication of the university.
13. To call for and receive reports from each editorial board for academic publications of the university.
14. To consider and recommend to the Vice Chancellor's Committee for approval an annual maximum amount of funding for each editorial board.

Constitution of the PSR&IC Membership will consist of the following:

Ex Officio Members:

1. Vice Chancellor
2. Deputy Vice Chancellor
3. Pro Vice Chancellor (Academic)
4. Pro Vice Chancellor (Administration)
5. Dean of Faculty of Postgraduate Studies Research and Innovation
6. Dean of Engineering
7. Chairman, Academic Ethics and Integrity Committee

Appointed Members:

1. One person appointed by the Vice Chancellor who will be Chairperson
2. Two Heads of Department
3. Two Professors
4. One academic staff with a strong background in research from each of the Sciences, Natural Resources, Engineering, Humanities, and Built Environment faculties.
5. A postgraduate student elected by the postgraduate students

Membership: Members of the PSR&IC for the period January 1, 2023 to December 31, 2024:

Ex Officio Members:

1. Professor Ora Renagi – Vice Chancellor
2. Professor Garry Sali – Deputy Vice Chancellor
3. Professor Shamsul Akanda –Pro Vice Chancellor (Academic)
4. Professor Kaul Gena – Pro Vice Chancellor (Administration)

5. Professor Gariba Danbaro, Dean of FoPSRI
7. Professor Tom Okpul - Chairman, Academic Ethics and Integrity Committee

Memberships:

1. Professor Gariba Danbaro – Chairman
2. Professor Cletus Gonduan
3. Professor Eric Gilder
4. Professor Tom Okpul
5. Dr. Mirzi Betasolo
6. Mr. Mathew Kuusa
7. Dr. Dapsy Olatona
8. Dr. Sujoy Jana
9. Dr. Steve Ales Korokan
10. Dr. Gwendolyn Ban
11. PG Student Representative

Executive Officer: Ms Pamela Dubaba, Senior Assistant Registrar (Academic)

EXECUTIVE SUMMARY

In 2024, the Papua New Guinea University of Technology (PNGUoT) underwent a significant academic restructuring. As part of its commitment to excellence in research, development, and postgraduate training, the Postgraduate School was renamed the Faculty of Postgraduate Studies, Research and Innovation (FoPSR&I).

The postgraduate student orientation and welcome program was held on 1st March 2024 under the theme *"Aspiring Individual and Community Excellence in Research and Innovation".* The event was attended by School Heads, Professors, academic staff, and members of the Senior Executive Management.

Academic outputs for 2024 included 121 peer-reviewed journal papers, 12 edited books, 24 book chapters, 81 conference/seminar presentations, pre-prints, and invited talks, as well as other scholarly contributions including a patent. A total of 52 postgraduate students completed their studies in 2024 and graduated in 2025. This group comprised 3 PhD, 7 MSc, 13 MPhil, 1 MCS, 2 MEngg, 11 EMBA, 5 MBA, and 10 PCSCT graduates.

Enrollment figures reached 112 students in Semester 1 and 29 in Semester 2. Of these, 18 students were supported through the University's Graduate Assistance Program (GAP). The university allocated one million Kina for research-related activities, supporting postgraduate research, conference participation, and the purchase of equipment. A total of K391,023.25 was disbursed for equipment and research, while K170,417.99 was used to support attendance at conferences, seminars, and workshops. A total of K561,441.24 was approved for research and related activities.

The Annual Postgraduate Research Seminar was held on 1st and 2nd October 2024, featuring 37 student presentations. Sessions were chaired by experts from the National Research Institute, PNG Science and Technology Secretariat, New Guinea Binatang Research Center (Madang), and National Agricultural Research Institute, reflecting strong national collaboration. Additionally, 18 presentations were delivered as part of the weekly research seminar series, featuring speakers from both local and international institutions.

From 1st to 4th July 2024, PNGUoT hosted the 7th Science and Technology Conference at its Taraka Campus, where over 125 papers were presented by national and international participants across disciplines such as science, technology, humanities, law, medicine, and the built environment.

The Interdisciplinary Journal of PNG University of Technology released two issues of its inaugural volume in 2024. Issue 1 featured 11 peer-reviewed articles, and Issue 2 included 7 articles. The university community actively participated in the conference and engaged with potential employers.

PNGUoT remains a proud member of the Association of Commonwealth Universities (ACU). In 2024, two international students completed their Master's programs under the Queen Elizabeth Commonwealth Scholarships (QECS), and another student was accepted into a Master's program in the School of Civil Engineering.

I would like to extend my sincere gratitude to the leadership of the Papua New Guinea University of Technology for their unwavering support. Special thanks go to Vice Chancellor Professor Ora Renagi, Deputy Vice Chancellor Professor Garry Sali, and Pro Vice Chancellor Professor Shamsul Akanda for their strategic guidance and for providing essential resources to the Faculty of Postgraduate Studies, Research and Innovation (FoPSR&I) and the Postgraduate Studies, Research and Innovation Committee (PSR&IC). I also acknowledge the Heads and staff of the academic schools whose commitment to research, postgraduate training, and scholarly publications continues to drive the university's academic excellence. My appreciation extends to the various administrative sections of the University, particularly the Bursary Department, whose cooperation has ensured the smooth operation of the FoPGSRI.

I am especially grateful to the dedicated administrative staff of the FoPGSRI—Ms Pamela Dubaba, Mr Terence Kaupa, and Ms Valerie Bulangol—for their invaluable assistance and tireless efforts in supporting our day-to-day operations.

Professor Rajashekhar Rao B.K.
Acting Dean, Faculty of Postgraduate Studies, Research and Innovation

SUMMARY OF RESEARCH OUTPUTS-2024*

Faculties/Schools	Journal Articles	Edited Books	Book chapters	Seminars/ Conference Papers/ Pre-prints/ Invited talks	Patents	PG students graduated		
						Certificate	Masters	PhD
Faculty of Built Environment								
Architecture and Construction Management	0	0	0	5	0	0	0	0
Surveying and Land Studies	12	0	1	12	0	0	3	1
Faculty of Engineering								
Civil Engineering	6	0	0	7	0	0	2	0
Electrical and Communication Engineering	2	1	6	3	0	0	3	0
Mechanical Engineering	24	4	13	10	0	0	0	0
Mining Engineering	4	0	0	2	0	0	0	0
Faculty of Humanities								
Business Studies	24	2	0	12	0	0	16	0
Communication and Development Studies	4	0	0	6	0	10	1	0
Faculty of Natural Resources								
Agriculture	3	2	0	9	0	0	8	0
Forestry	2	0	1	0	0	0	2	0
Faculty of Sciences								
Applied Physics	7	0	0	7	0	0	1	1
Applied Sciences	24	3	2	2	1	0	2	0
Mathematics and Computer Science	7	0	1	4	0	0	1	1
Centres of Research Excellence								
Centre of Excellence for Biotechnology	0	0	0	0	0	-	-	-
Centre of Excellence in Environmental Research	2	0	0	2	0	-	-	-
Total	121	12	24	81	1	10	39	3

*For counting inter-school publications, the publication is credited to the school of the author who contributed the most to the work (lead author).

FACULTY OF BUILT ENVIRONMENT

SCHOOL OF ARCHITECTURE AND CONSTRUCTION MANAGEMENT

Head of School: Dr. Jerry Walliah

Introduction

Several research projects have been undertaken in the subjects AR419, AR429, and AR320 as part of the *Design Research Agenda*. Numerous architecture and urban design development scenarios were explored in the fourth and fifth years of the Architecture undergraduate program, under the supervision and co-supervision of staff members with both research and professional expertise in architecture, building, urban planning, development, and urban design.

Similarly, fifth-year Bachelor of Building students and fourth-year Bachelor of Construction Management students conducted research through the AR591 and CM429 Research Project subjects. Design theses and research projects are carried out in both the undergraduate and postgraduate programs in Architecture and Construction Management, respectively.

Design Research

Design research is a method of inquiry focused on producing knowledge; in other words, it is a way of researching. It is often asserted that architectural design is to architecture what research is to science, and that "the process of architectural design is closely aligned with the process of knowledge creation in the sciences."

In this context, *design research* is often a prerequisite for any design outcome. It enables architects, in practice, to undertake an "informative" investigation for every design project, whether it involves new construction or retrofitting. This research explores a wide range of design issues, including variables, constraints, physical, social, cultural, and behavioral factors, geotechnical aspects, lateral and horizontal forces, superstructure considerations, material science, economic and ecological concerns, climate change impacts, building performance expectations, energy ratings, green energy ratings, and other built environment issues that a building may encounter throughout its lifespan.

Thoroughly researched and documented findings are compiled into a *Research Report* (*Design Brief*), which adds credibility and value to the final product — the building types and scales. All these elements are addressed and integrated through the *design research process* conducted over two semesters. A detailed *Design Brief* is developed and documented in AR591 during the third semester. This document is then utilized in the final *Design Thesis Production* by each student, under close supervision and guidance from thesis supervisors, meeting all the expectations outlined in the *Final Assessment Rubrics*, which capture the knowledge base required and demonstrated in the *Design Thesis*.

Undergraduate and Postgraduate Research Undertaken in 2024

Supervisor & Students	Research Title & Subject Code	Design Thesis 2024
	Research was conducted over three Semesters in AR419, AR429 Documentation of Thesis in AR320 Design Thesis.	
Supervisor	**ARCHITECTURE PROGRAM**	

Professor Cletus Gonduan	The following research and publication were carried out by final year students in both the Architecture undergraduate and postgraduate programs.	*All completed Design Theses are archived and published as part of the School's Undergraduate Design Thesis Publication Series. The 2024 edition is titled The Architectural Concept – Digital Thesis Publications 2024.*
Students		
Undergraduate Student Research		
Anna Mek	*Taraka Community School Library Architectural Concept Design of Wood-based Design Production is Papua New Guinea*	Design Thesis Completed
Elisha Nalepe	*Enga Provincial Police Head Quarters*	Design Thesis Completed
Daniel Osembo	*Retrofit the ERIKU – Shopping Centre an Urban Design Rethink Development Proposal within the City of Lae*	Design Thesis Completed
Master Student Research Engagement		
Daniel Ame and Solian Peter	*Building Performance Assessment (BPA) with Post Occupancy Evaluation (POE) Research and assessment of the Performance and User Occupational Dynamics of the Academic Building Infrastructure: A case study of the Architecture and Business School Building at the PNGUoT Campus*	This research is ongoing – expected to be completed by 2025.
Supervisor and Students	**Research Title & Subject Code**	**Design Thesis 2024**
Supervisor	**ARCHITECTURE PROGRAM**	
Dr Andrew Sariman	The following research and publication were carried out by final year students in Architecture both in the undergraduate (AR 319 & AR 329) and postgraduate programs (AR 419 and AR 429).	
Students		
Undergraduate Student Research		
Daniel Anggo	*Passive Design Strategies in the Warm-Humid Tropics Incorporated with Capstone Project titled: Unitech Guest House*	Design Thesis Completed
Besvin Chawan	*Biophilic Design Incorporated with PNGUoT Union Shop*	Design Thesis Completed
Daniel Osembo	*Thermal Comfort in the Warm Humid Tropics Incorporated with Oro Provincial Govt House of Assembly*	Design Thesis Completed
Ethan Lavai	*Evaluation of Green Walls Performances in Tropical Climates Incorporate with Kimbe International Arts Centre & Library*	Design Thesis Completed
Enoma Noki	*Natural Ventilation*	Design Thesis Completed
Felix Tanda	*Energy Conscious Buildings*	Design Thesis Completed
Kareko Bore	*Architecture in the Warm Humid Tropics*	Design Thesis Completed

Ronnie Arua	*Towards Sustainable Architecture: A Comprehensive Exploration of Green Building Principles and Practices*	Design Thesis Completed
Students		
Master Student Research Engagement		
Solian Peter	*Cross-Ventilation in Warm Humid Tropic Building Design*	This research is ongoing – expected to be completed by 2025.
Solian Peter	*Sustainable Architecture in the Context of Warm Humid Tropics*	
Supervisor	**ARCHITECTURE PROGRAM**	
Dr Winter Petilani	*The following research and publication were carried out by final year students in Architecture in the undergraduate program (AR 329)*	
Students		
Undergraduate Student Research		
Emmanuel Pet	*Affordable Residential Buildings for Teachers in Papua New Guinea*	Architecture Design Research - completed
Ronnie Arua	*Application of Green Building Strategies to proposed Abau District Administration Building*	Architecture Design Research - completed
Tonny Warima	*Eastern Highlands Provincial Health Office Complex*	Architecture Design Research - completed
Supervisor and Students	**Research undertaken & Subject Code**	**Design Thesis 2024**
Supervising Staff	**ARCHITECTURE PROGRAM**	
Davida Thomas	*The following research and publication were carried out by final year students in Architecture in the undergraduate program (AR 329)*	
Students		
Undergraduate Student Research		
Bernard Arua	*Bereina Market Design Research Report. The Architectural Concept – Digital Thesis Publications 2024*	Research Project Completed
Darren Ruben	*Design Report for Porgera Secondary School* Female Dormitory. *The Architectural Concept – Digital Thesis Publications 2024*	Research Project Completed
Kuga Boyd	*Kundiawa Lutheran Day Secondary School Library. The Architectural Concept – Digital Thesis Publications 2024*	Research Project Completed
Stanley Kenimo	*The Salvation Army Mini Convention Center. The Architectural Concept – Digital Thesis Publications 2023*	Research Project Completed
Glenson Kiripe	*Hotel Design – Speedway Motel User Satisfaction. The Architectural Concept – Digital Thesis Publications 2023*	Research Project Completed
Newman Makai	*Proposed Telga Health Center. The Architectural Concept – Digital Thesis Publications 2023*	Research Project Completed
Supervisor and Students	**Research undertaken & Subject Code**	**Design Thesis 2024**

Supervisor	**ARCHITECTURE PROGRAM**	
Clive Paigala	*The following research and publication were carried out by final year students in Architecture in the undergraduate (AR 329)*	
Students		
Undergraduate Student Research		
Felix Tanda	*Sustainable Medium Inns Embody the Spirit of Eco-Friendly Hospitality, Creating Spaces That Nurture Both Guest and The Planet*	Research Project Completed
Thomas Kepe	*Design Research and Updated Project Proposal For PNG Unitech Guest House*	Research Project Completed
Kareko Bore	*Unitech Conference Center Design Application and Report for Capstone Project*	Research Project Completed
Supervisor and Students	**Research undertaken & Subject Code**	**Research Project 2024**
Supervisor	**CONSTRUCTION MANAGEMENT PROGRAM**	
Dr. Jerry Walliah	*The following research and publication were carried out by final year students in Bachelor of Building Year 5 and Bachelor of Construction Management for completing undergraduate (AR592 and CM429) and Postgraduate (CM529) programs.*	*Completed Research Reports are cataloged and kept in the Departmental Research Report Collection: The Building Concept – Building Research Report Publications 2024*
Students		
Undergraduate Student Research		
Christopher Laukai	*Identifying and Mitigating the Factors Affecting Delays in Construction Projects*	Research Project Completed
Isaiah Laufa	*Identifying Students' Living Satisfaction Levels of Male Students Institutional Dormitories in Papua New Guinea: A Case Study of Papua New Guinea University of Technology Male Students Dormitories*	Research Project Completed
Nathan Jeremiah Andrew	*Assessing the Viability and Impact of Female Shared Dormitories Based on Student Satisfaction: A Post Occupancy Evaluation of Social Indicators at the Papua New Guinea University of Technology*	Research Project Completed
Duncan Koim	*Identifying the Factors Causing Housing Maintenance Issues: A Case Study of Papua New Guinea University of Technology, Lae*	Research Project Completed
Barnabas Api	*Identify The Impacts of Social Sustainability at the Male Halls of Residency: A Case Study of PNG Unitech*	Research Project Completed
Brian Paul	*Identifying Factors Causing Cost Overruns on the Construction Projects in Papua New Guinea:A Case Study of PNGUoT Construction Projects*	Research Project Completed
Tom Kaupa	*Causes and Effects of Poor Communication on Construction*	Research Project Completed
Jeskili Karu	*Examining the Effects of Skilled Construction Workers Shortage and Skill Gap in Papua New Guinea: A Case Study of Construction Firms Within Lae*	Research Project Completed
Louise Mary Tetemo	*Identifying the Level of Risk Management Practice on Delivering Road Construction Projects in Papua New*	Research Project Completed

	Guinea: A case study of Lae, Morobe Province	
Amos Japhet	*Identifying Factors Affecting Workers Performance on Construction Sites in Lae City Morobe Province*	Research Project Completed
Samuel Jonah	*Identifying Factors Causing Delay in Building Construction Projects in Papua New Guinea: A Case Study of PNGUoT Projects Office)*	Research Project Completed
Clyde-Obediah Inia	*Identifying the Causes of Awarding Construction Projects Based on Nepotism in PNG: A Case Study in Department of Works in East New Britain Province*	Research Project Completed
Henry Laua	*Effect of Planning on Construction Projects in PNG: A Case Study of Contractors in Lae City*	Research Project Completed
Justin Kuta	*Identifying the Issues of Adopting Advanced Construction Building Materials by Construction Companies in Papua New Guinea:A Case Study of Contractors in Lae City, Morobe Province*	Research Project Completed
Chrisperry Perone	*Factors Affecting Maintenance at University Department Buildings in Papua New Guinea*	Research Project Completed
Students		
Master in Construction Management - Student Research Engagement		
Vincent Kifas	*The Impacts of Risk Management on Construction Projects in Papua New Guinea*	Research Project – On going
Gideon Tamian	*The Effect of Change Management on Construction Project in Papua New Guinea: A Case Study of GoPNG funded projects at PNG University of Technology and Local Building Contractor*	Research Project – On going
Supervisor	**CONSTRUCTION MANAGEMENT PROGRAM**	
Dr. S.M. Khoshnava	*Research was conducted during the Semesters 1 & 2 of 4th Year and documented in CM419 as Research Report.*	*Reports are cataloged and maintained in the Departmental Research Report Collection under 'The Building Concept – Building Research Report Publications, 2024*
Students	**Topic**	**Status**
Susan Kiapmin	*The Impact of Workforce on Risk of High-risk Activities in the Execution Phase of a Construction Project*	Research Project Completed
Viola Kula	*Moving from Traditional Project Management to Digital Project Management Through Digital Twins*	Research Project Completed
Apiwi Tiaga	*Investigating the Risks of Adverse Procurement Management on Cost Overrun and Project Delay in the Pre-Construction Phase of Infrastructure Projects in Papua New Guinea*	Research Project Completed

Nathan Ray	*Inadequate Factors that Impact on Workers Safety in Construction Site*	Research Project Completed
Nimrod Kawa	*The Impact of Improper Drainage on Road Pavement Condition and Deterioration*	Research Project Completed
Kerrie Tokua	*Assessment of BIM implementation in the preconstruction phase to mitigate project constraints*	Research Project Completed
Nigel Gimai	*Understanding the Factors Contributing to Cost Overruns in Construction Projects in PNG*	Research Project Completed
Joylyn Luna	*Analyzing the Factors Contributing to Delays in Construction Projects*	Research Project Completed
Elish Gore	*Implementing Health and Safety Regulation for Workers in PNGs Construction Industry*	Research Project Completed

Conference Presentations

Kifas, V., Komabo, M., Purani, A., Tamian, G., & Khoshnava, M. (2024). Lean management in construction industry through BIM. In P. J. Jojo, E. Gilder, B. K. Rajashekhar Rao, A. K. Luhach, T. Sekac, R. S. A. Mcvie, & D. Olatona (Eds.), *PNG Science & Technology Conference Book of Abstracts* (7th ed., p. 41). Papua New Guinea Science and Technology Secretariat.

Komabo, M., Purani, P., Tamian, G., Kifas, V., Khoshnava, M., & Walliah, J. (2024). Challenges of applying circular economy in Papua New Guinea construction industry. In P. J. Jojo, E. Gilder, B. K. Rajashekhar Rao, A. K. Luhach, T. Sekac, R. S. A. Mcvie, & D. Olatona (Eds.), *PNG Science & Technology Conference Book of Abstracts* (7th ed., p. 39). Papua New Guinea Science and Technology Secretariat.

Purani, A., Komabo, M., Kifas, V., Tamian, G., Walliah, J., & Khoshnava, M. (2024). Safety management in construction industry through BIM in PNG. In P. J. Jojo, E. Gilder, B. K. Rajashekhar Rao, A. K. Luhach, T. Sekac, R. S. A. Mcvie, & D. Olatona (Eds.), *PNG Science & Technology Conference Book of Abstracts* (7th ed., p. 40). Papua New Guinea Science and Technology Secretariat.

Tamian, G., Khoshnava, M., Walliah, J., Komabo, M., Purani, A., & Kifas, V. (2024). Time management using BIM in the project life cycle. In P. J. Jojo, E. Gilder, B. K. Rajashekhar Rao, A. K. Luhach, T. Sekac, R. S. A. Mcvie, & D. Olatona (Eds.), *PNG Science & Technology Conference Book of Abstracts* (7th ed., p. 38). Papua New Guinea Science and Technology Secretariat.

Walliah, J. (2024, November 24–27). Addressing shortage of building construction academics in Papua New Guinea tertiary institutions. Paper presented at the *47th Australasian Universities Building Education Association (AUBEA24) Conference*, Victoria University, Melbourne, VIC, Australia.

SCHOOL OF SURVEYING AND LAND STUDIES

Head of School: Dr. Andrew Pai

Priority Research Areas of the School

The school'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 school is primarily involved in developing human resources adept in the holistic management of land resources and in eking out the best value out of them in a sustainable manner through coordinated research activities. It is also actively involved in finding Disasters, Risks, and Disaster Management, Disaster linked to climate change, tectonic activities. The human resources developed in the School have broad exposure to the state-of-the-art technology, e.g., recent developments in Remote Sensing, Geographic Information Systems, Photogrammetry, Global Positioning System / GNSS, use of latest Total Stations and allied implements of the digital era.

The school is also involved in many research programs, including densification of Benchmark points for PNG using the latest GPS / GNSS technology, GIS, remote sensing, and cartographic communication through thematic maps; property valuation, and land management research programs, and student projects. Some specific areas are given below:

1) Climate change studies
2) Land suitability for rice cultivation in PNG using Remote Sensing and GIS
3) Forest Biomass monitoring using Remote Sensing and GIS
4) Forests and Societal management
5) Inventorying Environmental Resources
6) Disaster Risk Reduction / Disaster Risk Management (DRR & DRM)
7) Urban sprawl detection
8) Groundwater mapping
9) Land use planning and management
10) Land Administration studies
11) Migration studies
12) Asset valuation studies
13) Cadastral Data Modeling
14) Management of incorporated land groups (ILG)
15) GNSS Survey and Vertical Adjustment of Madang Network
16) GIS In Customary Land Tenure Investigation
17) RS & GIS in Urban and Regional Planning
18) Mining and Its Impacts on Property Market
19) Residential Property Management
20) Public Educational Facility Management
21) Property Development Process in Papua New Guinea
22) Low Income Housing in PNG: Challenges and Opportunities
23) AHI land mobilization policy
24) Impacts on customary landowners under Plantation Redistribution Scheme
25) Impacts & effects of special agriculture and business lease (SABL) on customary landowners
26) Causes and effects of urban land values
27) Road Alignment (Horizontal/Vertical)
28) Drainage Design
29) Subdivision Design
30) Control Surveys using GPS/GNSS
31) Local Geoid study using GPS heighting on heighten MSL Benchmarks
32) GPS/GNSS to Cadastral Surveying in PNG
33) Infrastructure Development Surveys

34) Geodetic Control Surveying using GPS/GNSS
35) ILG (Integrated Land Groups) Customary Land Registration,
36) Renewable energy needs Feasibility study, etc.

Name of the Faculty Member/Position/Area of Specialization

Name	Position	Area of Specialization
Dr. Sujoy Kumar Jana	Professor	Hazard and Disaster Management, Resource Planning and Management, Geography and Management
Dr. Sailesh Samanta	Professor	Remote Sensing, GIS, Climatology, Geography, Natural Disaster, Disaster management, Site Suitability, Environment, Renewable energy
Mr. Wycliffe Antonio	Lecturer	GIS, Cartography, Geospatial Database modeling and development
Dr. Andrew Pai	Senior Lecturer	Property Valuation, Land Administration
Dr. Cathy Koloa	Senior Lecturer	Planning, Spatial Modeling, Hazard Management, Hydro geomorphology
Mr. Lewi Kari	Lecturer	Vegetation monitoring, Remote Sensing, GIS, Digital Image Processing, Manual Image Processing, Aerial Photogrammetry, Geography, Cartography, CAD, ILG. Web Mapping, Route Analysis
Mr. Jerry Mille	Lecturer	Land Administration, Social Mapping, ILG Creation, Land Disputes & Settlement
Dr. Tingneyuc Sekac	Senior Lecturer	Renewable and Clean Energy, Natural Resources and Disaster Management, Climatology, Rural Development Planning, Urban Planning, Remote Sensing, Geospatal Data Science, GPS, and GNSS
Dr. Rosemary Adu McVie	Senior Lecturer	Knowledge and Innovation place/spaces - 'knowledge (community) precincts', 'innovation and cultural districts', 'science and technology parks', 'high technology districts', and 'innovation clusters'. 'Property Management, Corporate Real Estate Management, Property Valuation, and Urban and Regional Planning.
Mr. Navua Kapi	Lecturer	Engineering Surveys and Designs, Lease Surveys, Remote Sensing & Photogrammetry, Urban and Regional Planning & Subdivision, Mine Survey, Geodesy and GPS, Hydrographic Surveying, UAV Surveying, and Mapping, Deformation monitoring, Underwater Lease Surveys, Construction Surveys, Rural and Urban Valuations, Survey Hardware and Software Maintenance and technician, Claims and BOQ for any Engineering and Construction services
Mr. James Seniala	Lecturer	Property Valuations, Property Management
Mr. Lepani Karigawa	Lecturer	Rural Valuation, Urban Valuation, Incorporated Land Groups, Property Management, Customary Land Registration
Mr. Clifford Jr Mespuk	Lecturer	Engineering Survey, ID Survey, Drainage Hydrology
Mr. Paulus Motoro	Lecturer	Property management, Property Valuation, Property Economics/Finance
Mr. Glan Yali	Lecturer	Geospatial Forest Biomass (Carbon) Modelling & Assessment for REDD+ Implementation, Pre-exploration Mineral Remote Sensing Detection, Customary Land Boundary Survey, Spatial

		Data Science, Marine Remote Sensing Detection, Soil Fertility Mapping, GPS Vehicle Tracking & Telematics
Ms. Camilla Yanabis Kwaudi	Lecturer	Cartography, GIS DBMS, Web mapping
Ms. Glenda Yatu	Senior Technical officer	GIS and Remote Sensing
Mr. Heva Honeaki	Senior Technical Instructor	Hydrographic Surveying, Computer-Aided Drafting, EDM Calibration, GPS GNSS, Cadastral Surveying, Automated Surveying
Mr. Adward Buidal	Principal Technical officer	Certified UAV Pilot (Drone Pilot), Surveying Profession, specifically Mining and Civil Engineering Survey, Cadastral Surveying.
Mr. Joe Yapakae	Senior Technical officer	Cadastral Surveys and Engineering Surveys
Dr. Richard Stanaway	Associate Professor	Monitoring tectonic hazards using GNSS, geodetic reference frame modernisation in PNG and GNSS surveying
Mr. Jeffery Petrus	Lecturer	Property Valuation, Property Mangement, Land Taxation, Pproeprty Investment

Journal Articles

Crook, C., Kelly, K.M., Lott, R. & Stanaway, R. (2024). The GGXF Standard File Format for Gridded Geodetic Data. In: *International Association of Geodesy Symposia*. Springer, Berlin, Heidelberg. https://doi.org/10.1007/1345_2024_254

Den, E., & Samanta, S. (2024). Site Suitability Analysis for Solid Waste Disposal Using Multi-Criteria Analysis: A Case Study of Lae City, Morobe Province, Papua New Guinea. *International Journal of Geoinformatics*, 20(7), 17–27. https://doi.org/10.52939/ijg.v20i7.3399

Gairo, R., Samanta, S., & Koloa, C. (2024). Riverine Flood Susceptibility Analysis Through Frequency Ratio Model – A Case Study in the Sepik River Basin, Papua New Guinea. *Melanesian Journal of Geomatics and Property Studies*, 10, 52-65.

Han, S.C., Sauber, J., Broerse, T., Pollitz, F., Okal, E., Jeon, T., Seo, K., & Stanaway, R.. (2024). GRACE and GRACE Follow-on Gravity Observations of Intermediate-Depth Earthquakes Contrasted with Those of Shallow Events. *Journal of Geophysical Research: Solid Earth*, 129, e2023JB028362. https://doi.org/10.1029/2023JB028362

Karipal, R., Kari, L., & Kwaudi.Y.C. (2024). An Integration of Geomatics to Develop a DCDB for Peri-Urban Customary Land - A Case Study of Igam- Block Settlement, Lae. *Melanesian Journal of Geomatics and Property Studies*, 10, 28-40. https://mjgps.org/wp-content/uploads/2025/03/MJGPS202403.pdf

Kopio, D., & Samanta, S. (2024). Correction: Above Ground Biomass Estimation of Pinus caribaea in the Bulolo-Wau Forest Plantation Area, Papua New Guinea. *Arabian Journal of Geosciences*, 17(2), 65. https://doi.org/10.1007/s12517-024-11876-w

Mukhopadhyay, A., Pal, I., Hati, J.P., Pramanick, N., Acharyya R., Kumar, A., Jana, S. K., & Mitra D. (2024). High-resolution Pléiades data: an In-depth Analysis of Applications and Future Prospects. *Spatial Information Research* 32, 739–755. https://doi.org/10.1007/s41324-024-00593-x

Paraka, J., Kapi, N.A., Sekac, T., & Jana, S.K (2024). Upgrading permanent Survey Marks Infrastructure: a Case Study in Lae City of Papua New Guinea. *Spatial Information Research,* 32, 215–230. https://doi.org/10.1007/s41324-023-00548-8

Peya, N., & Kapi, N.A. (2024). UAV Technology Versus PNG's Conventional Surveying Methods in Cadastral Survey Applications. *Melanesian Journal of Geomatics and Property Studies*, 10, 16-28. https://mjgps.org/wp-content/uploads/2025/03/MJGPS202402.pdf

Samanta, S. (2024). Identification of Agricultural Drought through Vegetation Health Analysis at Erap Station under the Markham Valley of Papua New Guinea. *International Journal of Geoinformatics*, 20(11), 106–115. https://doi.org/10.52939/ijg.v20i11.3691

Sekac, T., Jana, S.K., & Pal, I. (2024). Spatio-temporal Vegetation Cover Analysis to Determine Climate Change in Papua New Guinea, *International Journal of Disaster Resilience in the Built Environment*, 15(1), 116-140. https://doi.org/10.1108/IJDRBE-05-2022-0045

Stanaway, R., Crook, C., Kelly, K. M., & Lott, R. (2024). A functional model for quantifying deformation in reference frame transformations. *International Association of Geodesy Symposia*, 1–6. Springer. https://doi.org/10.1007/1345_2024_247

Book Chapter

Koloa, C., & Samanta, S. (2024). Hydrological analysis and assessment of inland flood risk using geospatial data. In Pal S.C., Roy, S.S., Saha, A., & Abioui, M. (Eds.). *Water Resources Monitoring, Management, and Sustainability: Application of Geostatistics and Geospatial Modeling*, 16, (pp.129-151). Elsevier, The Netherlands. https://doi.org/10.1016/B978-0-443-23665-5.00006-5

Conference Proceedings/Workshop/Seminar

McVie, A.R., Koloa, C. & Kwaudi, C. (2024, October). *Classifying Knowledge and Innovation Places in Papua New Guinea: Adoption of a Modified Innovation District Classification Framework*. Paper presented at 56th Annual ASPNG Congress, Paper ID: ASPNG202418, PNG University of Technology, Lae, Morobe Province, Papua New Guinea.

Ape, J., Bathhula, S., & Samanta, S. (2024, July). *An Impact Evaluation of Groundwater Quality Parameters Near, Open Dump Site at PNG University of Technology Perimeter*. Paper presented at 7th National Science and Technology Conference, PNG University of Technology, Lae, Morobe Province, Papua New Guinea.

Den, E., & Samanta, S. (2024). *Demarcation of Suitable Land for Rice and Wheat Cultivation Using Multi-Criteria Decision-Making Approach: a case study in Southern Highlands Province of Papua New Guinea*. In Maim, G., Petterson, M.G., Holm, R., Bokuik, A., & Espi, J.O. (Eds). *Abstract Volume - Draft Version of the Second Geoscience, Exploration and Extraction for Sustainability* (pp. 17-18). Mineral Resource Authority, Post Moresby, Papua New Guinea.

Den, E. & Samanta, S. (2024). Demarcation of Suitable Land for Rice and Wheat Cultivation Using Multi-Criteria Decision-Making Approach: a Case Study in Southern Highlands Province of Papua New Guinea. In Maim, G., Petterson, M.G., Holm, R., Bokuik, A., & Espi, J.O. (Eds). *Abstract Volume - Draft Version of the Second Geoscience, Exploration and Extraction for Sustainability* (pp. 71-72). Mineral Resource Authority, Post Moresby, Papua New Guinea.

Koloa, C., & Samanta, S. (2024). Inland flood modelling of the Sepik River basin in Papua New Guinea using GIS and remote sensing techniques. In Maim, G., Petterson, M.G., Holm, R., Bokuik, A., & Espi, J.O. (Eds). *Abstract Volume - Draft Version of the Second Geoscience, Exploration and Extraction for Sustainability* (pp. 100). Mineral Resource Authority, Post Moresby, Papua New Guinea

Kari, L., Napitalai, A., Tomon, B., & Lati, J. (2024, October). A PNG National Spatial Data Infrastructure (NSDI): A Comprehensive Overview of NSDI Objectives, Conceptual Framework, Implementation Strategies, and Governance. 56th Annual ASPNG Congress, Lae, Morobe Province, Papua New Guinea. Retrieved from http://www.aspng.org/techinfo.htm

Kari, L., & Napitalai, A. (2024, June). *A PNG National Spatial Data Infrastructure (NSDI): Data Governance on a PNG NSDI and Proposed Implementation Flowchart*. Paper presented at DICT Data Governance Workshop, Papua New Guinea University of Technology, Lae, Papua New Guinea.

Mohamed, A., Goru, D., & Samanta, S. (2024). Potential Provinces in Papua New Guinea for Rice Farming. *E3S Web of Conferences*, 477, 00095. https://doi.org/10.1051/e3sconf/202447700095

Peya, N. (2024, October 14–18). *UAV technology versus PNG's conventional surveying methods in cadastral survey applications*. 56th Annual ASPNG Congress, PNG University of Technology, Lae, Morobe Province, Papua New Guinea.

Samanta, S. (2024, July 1–4). *Spatial modelling of surface soil moisture using remote sensing and geographic information system* (p. 36). 7th National Science and Technology Conference, The Papua New Guinea University of Technology, Lae, Morobe Province, Papua New Guinea.

Samanta, S. (2024, October 14–18). *Modelling of agricultural drought using open-source satellite data* (Paper ID: ASPNG202401). 56th Annual ASPNG Congress, PNG University of Technology, Lae, Morobe Province, Papua New Guinea.

Sekac, T., & Jana, S. K. (2024, November 25–29). *Geospatial technology for climate-resilient road infrastructure management and planning in the inland regions of Papua New Guinea*. 2024 Pacific Islands GIS & Remote Sensing Conference, University of the South Pacific, Suva, Fiji.

Sekac, T., Maika, N., Jana, S. K., Renagi, O., Aiau, S., & Olatona, D. (2024, July 3–5). *Sustainable planning for the development of site-specific run-of-river hydropower: A case study in Gonovo River of Finschhafen District, PNG*. First International Conference on Sustainable Energy Education (SEED 2024), Universitat Politècnica de València, Spain.

Sekac, T., Jana, S. K., & Sindang, C. K. (2024, October 14–18). *Planning and inventory management for rural road infrastructure in mountainous region: A case study in Finschhafen District, PNG*. 56th Annual ASPNG Congress, PNG University of Technology, Lae, Morobe Province, Papua New Guinea.

Project Funding Received

Adu McVie, R., Koloa, C., & Kwaudi, C. (2024). *Classifying knowledge and innovation places in Papua New Guinea: Adoption of a modified innovation district classification framework* [Funded research project]. Papua New Guinea University of Technology, Postgraduate, Research, Science & Innovation Committee (PSR&IC)., PNG University of Technology, Lae, Papua New Guinea

Samanta, S., & Sekac, T. (2021–present). *Better soil information for improving PNG's agricultural production and land use planning – Building on PNGRIS and linking to the Pacific Regional Soil Partnership* (Project No. SLAM2019-106) [Collaborative research project]. Australian Centre for International Agricultural Research (ACIAR).

Undergraduate Research Projects

Year 4 BGIS Program

Student Name	Topic	Supervisor
Aravapo Irienah	*Identifying and Monitoring of Urban Heat Islands Using Spectral and Thermal Analysis: A Case Study of Lae District, Morobe Province*	Mr. Kari
Avosa Esther	*An Assessment of Flood Risk Susceptibility in Malalaua, Gulf Province*	Dr. Samanta
Charlie Willie	*Application of Geo-Spatial Technology to Identify Potential Resettlement Locations for Evicted Settlers: A Case Study in Lae, Morobe Province*	Mr. Kari
David Timothy	*Assessing the Impact of River Shifts and Bank Erosion With its Effects on Local Communities Using Remote Sensing & GIS Techniques: A Case Study of Busu River, Morobe Province'*	Dr. Sekac
Gairo Ravu	*Inland Flood Susceptibility Analysis in the Sepik River Basin Using GIS and*	Dr.

	Frequency Ratio Model	Samanta
Gipo Palki	*A change detection study for Lae Coastline*	Dr. Koloa
Huafolo Cleopatra	*Using GIS AND RS Techniques to Assess Flood Risk of Busu River in Morobe Province, PNG*	Dr. Sekac
Jerry Tamicah	*Monitoring Forest Resource using geospatial tools of Pomio District, East New Britain Province*	Dr. Jana
Jim Ronda	*Flood Hazard and Risk Assessment of Garia River, Lae Morobe Province: An Approach using GIS and Remote Sensing*	Dr. Koloa
Nomex Kesal	*Application of GIS and Remote Sensing Techniques in Urban Planning (Case Study of Lae City).*	Dr. Jana
Kipkipsok Terence	*Land Suitability Analysis for Sugarcane Plantation in Morobe, PNG*	Dr. Samanta
Lius Harley	*A Geospatial Application in Land taxation Management System : A Case of Eriku in Lae City*	Dr. Jana
Laskam Tabitha	*Using Change Detection to Identify Coastline Changes (Coastal Delineation): A Case Study in LAE , Morobe Province*	Dr. Koloa
Masange Josiah	*Using web GIS to Create an Online Housing Interface of Staffs Residing at Area 1 of the Unitech Campus, Using WEB GIS.*	Mrs. Kwaudi
Mondo Paul	*Geospatial Analysis of Erosion & Sedimentation Around the OKTEDI MINING Area & its Impact Assessments*	Dr. Samanta
Mogia.Jacob	*A Geospatial Approach on Land Suitability Analysis for Coffee Production in Eastern Highlands Province, Papua New Guinea.*	Mr. Antonio
Murphy Sylvia	*Vegetation Monitoring & Change Assessment within NBPOL's Forestry Blocks and HCV Sites: A Case Study Using Change Detection Technique at Ramu*	Dr. Samanta
Oruga Jollen	*An Analysis of Settlement Pattern Changes in The Fringe Suburbs of Lae City Using GIS and Remote Sensing - A Case of East Taraka and West Taraka*	Mr. Antonio
Patma George	*Runoff River Hydropower Infrastructure Planning for Reliable Electricity :A Case Study in Kundiawa Gembogl district.*	Dr. Sekac
Peng Ruben	*Monitoring Urban Growth and Land Use Land Cover Change Detection Using Remote Sensing and GIS: A Case Study in Lae Morobe Province*	Dr. Samanta
Pereap Jason	*Assessing Earthquake Risk for PNG LNG GAS Onshore Pipeline Route Using Geospatial Technology*	Dr. Sekac
Raymond Dinah	*Utilizing Remote Sensing and GIS Technology in Monitoring and Detecting LULC changes Patterns of Informal Settlement – a Case Study of Awagasi Community*	Dr. Koloa
Sengi Kenneth	*Enhancing Traffic Management through GIS-GPS Techniques for the Eriku to Kamkumung Roadway in Lae City*	Mr. Antonio
Timothy Petex	*Tuberculosis Hotspots Detection Using GIS & Remote Sensing Techniques: A case study of PNG-UOT campus, Lae, Morobe Provinc"*	Mrs. Kwaudi
Tiniou Leilani	"Suitability Analysis in identifying optimal sites ofPhotovoltaic (PV) Solar farms using Geospatial Technologies (GIS-AHP): Case study of East NewBritain Province"	Mr. Kari
Ubuk Alford	Shoreline mapping and change detection analysis of Vocopoint and its surrounding: A Geo-spatial analysis.	Dr Jana
Urama Erick	*An Assessment of Malaria in PNG Unitech Using GIS & Remote Sensing Technique.*	Mrs. Kwaudi
Vai Joseph Koia	*Map Groundwater Potential Zones in the Ormond Watershed Area for a Water System Project in Kelekapana and Neighbouring Villages*	Mr. Antonio
Wanu Gabrian	*Enhancing Lae Botanical Garden Management Through GIS Integration*	Mr. Kari
Wasen Bethsaidah	*Detecting Temporal Urban Growth Patterns Through the Integrated Use of GIS and Remote Sensing in the Lae Urban Area*	Mr. Kari

Yanderave Samuel	*Spatial modelling of Landslide Risk Assessment :A Case Study of Daulo District, Eastern Highlands Province*	Dr. Samanta
Yoko Aiye-Koita	*Mapping the Solar Harvest: GIS Analysis for Efficient Solar Resource Utilization in Morobe Province*	Dr. Sekac

Year 4 BPST Program

Student Name	Topic	Supervisor
Delilah Ade	*Proposed model for Tourism Hub in Rabaul Town, Papua New Guinea*	Dr. Adu McVie
Wellington Andrew	*Assessing the Performance of Customary Land for Real Estate Development in PNG: Case of Raven Estate and KB Development in Alotau Town*	Dr. Adu McVie
Lillian S. Jaima	*The Rehabilitation of Baruni Dump: A Proposal for Sustainable Waste Management and Environmental Conservation*	Dr. Adu McVie
Robina Kera	*Investigating Solid Waste Disposal Facilities in Lae City*	Dr. Adu McVie
Joanne Kalai	*Assesing the Performance of Corporate Real Estate in Higher Institutions of PNG: The Case of PNG Polytechnical Institute, Lae*	Dr. Adu McVie
Tua'Ina Leong	*Impacts of Urban Encroachment in the Central Province: The Case Study of PNG LNG Project Impacted Villages*	Dr. Adu McVie
Shamilla Sabumei	*Proposed Goroka Town Boundary Expansion and Resettlement of the Squatter Settlements: The Case of Genoka and Piswara Blocks*	Dr. Adu McVie
Felicia Steven	*Effects of Urbanisation on Hanuabada's Existing Solid Waste Management System*	Dr. Adu McVie
Delmah Aulo	*Identifying Obstacles/Hindrances Withholding Customary Land Owners in Goroka from Registration of ILG and Customary Land Registration*	Dr. Andrew Pai
Halei Nimbongi	*Urbanisation and the Property Development in Lae, PNG: Analysing the Challenges of Informal Settlement and Infrastructure Expansion*	Dr. Andrew Pai
Abel Sina	*Assessing Factors Affecting the Management of Residential Apartments in Lae City*	Dr. Andrew Pai
Fiora Sipelung	*The Effects of Water and Sanitation Services on the Rental Values of Residential Properties in Selected Informal Settlements in Lae City*	Dr. Andrew Pai
Warrick Soondrawu	*Performance Evaluation of Male and Female Dormitories: The Case of PNG Unitech*	Dr. Andrew Pai
Terence Taule	*Assessment of Public Servants Housing: A Case Study of Primary School Teachers Homes in Lae City*	Dr. Andrew Pai
Charlie Hame	*Investigating Customary Land Ownership Conflicts in Mining Communities: A Case Study from PDL1, Hides, Tari-Hela Province*	Mr. P. Motoro
Daphaney Korua	*An Assessment of Land Taxation in PNG: A Case Study of Port Moresby*	Mr. P. Motoro
Elijah Kunal	*Land Re-adjustment as a Mechanism for Urban Planning to Increase State Land Supply for Housing Development: A Case for Kundiawa Town, Papua New Guinea*	Mr. P. Motoro
Wesley Majirawe	*Proposed Public Housing Scheme in Lae City: The Case of Angau Provincial Hospital*	Mr. P. Motoro
Norah Nahua	*Subsidize Housing in Port Moresby*	Mr. P. Motoro
Adam Roka	*Customary Land and Economic Development*	Mr. P.

		Motoro
Della Saulo	*Utilization of Vacant Land Within Lae City; Accessing Customary Land for Urban Development: Lessons Learnt from Ahi Customary Land Owners*	Mr. P. Motoro
Stephanie Yaa	*Investigating the Possibilities of Expanding Kundiawa Town Boundary*	Mr. P. Motoro
Jimmy Ofekure	*Registration of Customary Land on Urban Fringe Under ILG for Socio-Economic Purpose: The Case of Derekone, Port Moresby, NCDC*	Mr. J. Seniela
Nathaniel A. Ovia	*Real Estate Investment Trust and Their Potential in Papua New Guinea*	Mr. J. Seniela
Japeth Peter	*A Case Study of Land Grabbing in Chuave District of Simbu Province*	Mr. J. Seniela
Grace Pupu	*Rental Rates Applied on Informal Rental Accommodation on the Fringes of Lae City*	Mr. J. Seniela
Noka Ravu	*Explanatory Studies of Land and Property Values in Taurama, Port Moresby NCD*	Mr. J. Seniela
Michael Smith	*A Strategy to Provide Affordable Rental for Formal Rental Properties in Lae City*	Mr. J. Seniela
Stancher Yakopis	*Residential Property Tax Collection in PNG: The Case Study of Lae City Local Authority*	Mr. J. Seniela
Noel Mong	*Identification of Productive Agricultural Land Use for Socio-Economic Development in Neblayer Rural ILG*	Mr. J. Mille

Year 4 BTSR Program

Student Name	Topic	Supervisor
Arnold Komeali Laurie George	*Road Alignment from Igam -Wine Road*	Mr. E. Buidal
Elvis Aglua	*Conducting Drill and Blast Set Out in Underground Mines and Desgning of Pipe Lines for Pipe Installation*	Mr. E Buidal
Brendon Hape Jacob Rumints	*Construction Survey of a Permanent Structure (Graduation Hall) for the PNGUoT*	Mr. J . Yapakae
Naith Hava Marcelino Hombohori	*Quantify Amount of Backfill to Achieve Sufficient Spacing for Recreational Park Development*	Mr. N . Peya
Raymond Marcus	*Setting Out Drill and Blast Collar*	Mr. E. Buidal
Kuamin Aiso Akim John	*Subdivision of PTC to Facilitate for Future Developments*	Dr. R Stanaway
Hans Biwason	*Pit Design Optimization and Blast – Unitech Campus*	Mr. E. Buidal
Isaac Damon	*Bathymetric Survey of an Alternate Land Based Waste Disposal*	Mr. H. Honeaki
Samson Enock	*Pit Design Optimization and Blast – Unitech Campus*	Mr. E. Buidal
Paul Goiye	*A Power Line Surveying Using UAV Technique to Provide Detailed Planning and Updating*	Mr. H. Honeaki
Goasa Kila Hubert Wrondimi	*New Residential Subdivision at Unitech Dump*	Mr. N. Peya

Mark Kimbe Kawage	*Pit Design - an optimization and Blast - Unitech*	Mr. N. Peya
Gideon Luio Raymond Piwai	*Upgrading and Rehabilitation of Existing Road at East Taraka, Ward 6*	Mr. N. Peya
Kautete Varo Anthony Sapak	*Design an Underground Using Drill and Blast Method*	Mr. E. Buidal
Jerimoth Seleng Stanley Neinaka	*Subdivsvion of Land Parcel Boundaries at Nadzab*	Mr. J. Yapakae
Sailas Umota	*Volumetric Stock Pile, Kamkumung*	Mr. N. Peya
Joshua Malai Paska Yamuna	*Road Design Over Inner Filled Area of Lihir Ireland*	Mr. E. Buidal

Postgraduate Students Research Projects

Name	Study program	Research Topic	Supervisor/s
Mespuk Jr. Clifford	Ph.D.	*The Application of UAV & Remote Sensing for Rural Development in PNG – A case Study of Nomad District Planning in Western Province*	Prof. Sujoy Kuamar Jana and Dr. Tingneyuc Sekac
Diandra-Joy Oli	M.Phil.	*Drought Risk Assessment Using Gis and Remote Sensing: A Case Study in the Markham-Ramu Region of Papua New Guinea*	Dr. Tingneyuc Sekac and Mr. Lewi Kari
Den Einstein	M.Phil.	*Land Suitability Analysis for Rice and Wheat Cultivation Using a GIS-Based Fuzzy Multi-Criteria Decision-Making Approach: Southern Highlands Province, Papua New Guinea*	Prof. Samanta

FACULTY OF ENGINEERING

SCHOOL OF CIVIL ENGINEERING

Head of School: Dr. Mirzi Betasolo

Introduction

The School of Civil Engineering (SoCE), formerly known as the Civil Engineering Department and renamed in 2024, offers a refreshed four-year undergraduate program: the Bachelor of Civil Engineering (Honours), B.Eng. (Civil) (Hons). This fully accredited program is recognized by Engineers Australia, a signatory to the Washington Accord. The qualification is classified as Level 8 under the Papua New Guinea National Qualifications Framework, equivalent to Level 8 of the Australian Qualifications Framework. SoCE operates under the Faculty of Engineering, which is overseen by the Dean of Engineering.

Civil Engineering is the first and oldest engineering program in Papua New Guinea, established in 1966 in Port Moresby at the Papua New Guinea Institute of Higher Education. In 1968, the program was relocated to Lae, and in 1970, the institution was renamed the Papua New Guinea Institute of Technology. It attained university status in 1973 and became known as the Papua New Guinea University of Technology (PNGUoT), commonly referred to as Unitech. In 1980, the university transitioned from a faculty-based structure to a departmental system to support the introduction of four-year Bachelor programs with direct entry from Grade 12. Under this structure, the university comprised 13 departments, including four engineering departments, of which Civil Engineering was one. In 2024, PNGUoT reintroduced a faculty–School–Department hierarchical structure. This change was aimed at granting departments greater autonomy in the design and delivery of their academic programs.

SoCE also offers a two-year postgraduate program by coursework, leading to a Master in Engineering, with specializations in Structural Engineering, Environmental Engineering, Construction and Project Management, Transportation Engineering, Water Resources Engineering, and Geotechnical Engineering. Additionally, it offers a Master of Science in Solid Waste and Resource Management. For those interested in advanced research, SoCE provides on-campus programs leading to a Master of Philosophy (MPhil) and a Doctor of Philosophy (PhD).

The SoCE is equipped with modern laboratories and continues to upgrade its facilities with the latest equipment and software, supported by the Industrial Advisory Board (IAB). The school also benefits from guidance provided by its Discipline Industrial Advisory Committee (DIAC), which plays a key role in ensuring the relevance of the curriculum to current industry needs. Additionally, the Research, Development & Engagement Committee (RDEC) is responsible for enhancing the school's research output, innovation initiatives, and external engagement activities.

As of the latest reporting period, the school has 11 full-time academic staff: six with PhD degrees, one is currently pursuing a PhD, and have Master's degrees.

The current student enrolment includes: 1 PhD candidate, 1 MSc candidate in Solid Waste and Resource Management, 4 MEng candidates, 4 MPhil (Civil Engineering) candidates and 185 undergraduate students.

Area of Specialization of the Civil Engineering Academic Staff

- **Environmental Engineering**
  - Dr. Revanuru Subramanyam
  - Dr. Mirzi Betasolo
  - Mr. Willie Doaemo
  - Dr. Alak Kumar Patra
  - Mr. Jedge Kasadimi
  - Dr. Rostami Rahele
- **Structural Engineering**
  - Dr. Alak Kumar Patra

- Dr. Jallipali Prasad
- Dr. Mirzi Betasolo
- Ms. Grace Wantepe

- **Transportation Engineering**
  - Dr. Mirzi Betasolo
  - Dr. Alak Kumar Patra
  - Mr. Murray Konzang
  - Dr. Talakola Laksmi Ramadasu
- **Geotechnical Engineering**
  - Dr. Talakola Laksmi Ramadasu
  - Dr. Mirzi Betasolo
  - Mr. Murray Konzang
  - Dr. Alak Kumar Patra
- **Construction & Engineering Management**
  - Dr. Mirzi Betasolo
  - Dr. Alak Kumar Patra
  - Mr. Murray Konzang
  - Mr. Roboam Pebuar
  - Ms. Stephanie Konts
  - Ms. Grace Wantepe
  - Dr. Meysam Khoshnava
- **Water Resources Engineering**
  - Dr. Mirzi Betasolo
  - Ms. Stephanie Konts
  - Mr. Roboam Pebuar
  - Ms. Grace Wantepe

The School of Civil Engineering's Priority Research Areas

- **Environmental Engineering**
  - Solid Waste Management
  - Water & Wastewater Testing and Treatment
  - Sediment Analysis to Know the Pollution Status of Rivers
  - Design of Water/Sewage Treatment Systems
  - Design of Air Pollution Control Systems
  - Anaerobic Treatment
  - Environmental Impact Assessment
  - Recycling, Waste to Material Resource
- **Structural Engineering**
  - Engineering Properties of Steel, Concrete, Gravel, Cement, Timber, Coconut Timber, Normal & Advanced Composites, Sustainability of Structures etc.
  - Mechanics of Advanced Composite Materials. Application of Artificial Intelligence to Materials and Mechanics
  - Earthquake Impact on Structures, Vulnerability of Structures Due to Ground Movements, Microzonation
  - Structural Stability
- **Transportation Engineering**
  - Traffic Surveys & Design of Roads
  - Econometrics on Road Development
- **Geotechnical Engineering**
  - Engineering Properties of Soil, Slope Stability, etc.
  - Geosynthetic Material

- ❖ Geotechnical System Isolation

- **Construction & Engineering Management**
  - ❖ Engineering Properties of Soil, Slope stability, etc.
  - ❖ Geosynthetic Material
  - ❖ Construction Practices
- **Water Resources Engineering**
  - ❖ Aquifer Stability, Drinking Water Sustainability
  - ❖ Impact of Waves on Structures

Journal Articles Published

Betasolo, M., Wantepe, G., Edwards, M., & Corby, N. (2024). Structural assessment on buildings vulnerability to seismic hazards in the Lae City, the industrial hub of Papua New Guinea. *Global Journal in Civil Engineering, 7*(1). https://doi.org/10.5281/zenodo.13357947

Patra, A. K. (2024). Influence of textile reinforcement on the thermal behavior of steel reinforced concrete: Experimental investigation. *International Journal of Scientific Research and Engineering Trends, 10*(4), 1550–1553. https://ijsret.com/wp-content/uploads/2024/07/IJSRET_V10_issue4_336.pdf

Patra, A. K., Chaudhary, A., Pandey, A., & Goswami, S. (2024). Functional planning, analysis and design of G+4 sustainable commercial office building in large city corporation area under COVID-19 situation. *International Journal of Scientific Research and Engineering Trends, 10*(4), 1712–1715. https://ijsret.com/wp-content/uploads/2024/07/IJSRET_V10_issue4_357.pdf

Patra, A. K., & Singh, A. K. (2024). Applicability of artificial intelligence and artificial consciousness in Papua New Guinea. *Melanesian Journal of Geomatics and Property Studies, 10*, 1–15.

Patra, A. K., Silip, M., Grismitha, B., & Subaiga, I. D. G. (2024). Comparative applicability of strength of materials approach to laminated composites with glass and carbon fibre prepregs. *Journal of Physics: Conference Series, 2888*(1), 012021. https://doi.org/10.1088/1742-6596/2888/1/012021

Singh, A. K., & Patra, A. K. (2024). Cybersecurity support in IoT: Causes and solutions in engineering. *International Journal of Scientific Research in Multidisciplinary Studies, 10*(5), 107–119.

Singh, A. K., & Patra, A. K. (2024). India vision and support for development in Papua New Guinea (PNG). *Interdisciplinary Journal of Papua New Guinea University of Technology, 1*(2), 147–159.

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Wantepe, G. M., & Betasolo, M. (2024). Structural health assessment of steel girder bridge: A case study of Butibam and Bumbu Bridge in Lae City. *Global Journal in Civil Engineering, 6*(1), 1. https://doi.org/10.5281/zenodo.10450865

Conference Papers and Presentations

Betasolo, M., Lee, L., Mana, C., Pitakoe, L., Boko, M., & Pebuar, R. (2024, July 9–12). *Geomaterial for shoreline protection*. GEOANZ#2 Conference on Advances in Geosynthetics, Melbourne, Australia.

Betasolo, M., Olatona, D., & Gupta, S. (2024, July 1–4). *Waste to affordable micro renewable energies*. In *Proceedings of the 7th National Science and Technology Conference–2024*, PNG University of Technology, Lae, Morobe, Papua New Guinea.

Gairo, L., Hayes, C., Garo, N., Mbuleau, E., & Betasolo, M. (2024, July 1–4). *Student's perception of campus*

infrastructures towards attaining sustainable waste management, transportation, water and energy conservation, and safety: The case of Papua New Guinea University of Technology. Presented at the 7th National Science and Technology Conference–2024, PNG University of Technology, Lae, Morobe, Papua New Guinea.

Patra, A. K. (2024, July 1–4). *An inquiry on Industry 4.0 for sustainable growth*. Presented at the 7th National Science and Technology Conference–2024, PNG University of Technology, Lae, Morobe, Papua New Guinea.

Patra, A. K., & Singh, A. K. (2024, July 1–4). *Artificial consciousness and intelligence*. Presented at the 7th National Science and Technology Conference–2024, PNG University of Technology, Lae, Morobe, Papua New Guinea.

Patra, A. K., Silip, M., & Subagia, I. D. G. (2024, August 19–22). *Numerical modelling of unidirectional composites*. Presented at the 11th Global Conference on Polymer and Composite Materials (PCM 2024), Xi'an, China.

Sugiarti, N. W., Subagia, I. D. G., Vista, F. P., Patra, A. K., Adriani, I. N. M. A., & Sukadana, I. G. K. (2024). Effect of chemical additives added on hybrid composites epoxy with glass-jute fibers reinforcement in review flammability and fire-retardant performances. *AIP Conference Proceedings, 3053*(1). https://doi.org/10.1063/5.0194425

Postgraduate Students and Their Research Topics

Name	Supervisor	Program	Research Title
Mr. Murray Konzang	Dr. Mirzi Betasolo	PhD in Civil Engg.	*Optimization of Road Infrastructure in Momase Region (as an economic zone) by Econometrics Modelling*
Stephanie Konts	Dr Mirzi Betasolo	MPhil/2	*Vulnerability Assessment of Engineering Groundwater to Pollution-Taraka*
Sujan Ghimire	Dr. Revanuru Subramanyam	MPhil/2	*Comparative Assessment of Seismic Performance of Concrete Gravity Dam and Rock Filled Dam Founded in Different Ground Conditions Located in High Seismic Zone within Ring of Fire, Papua New Guinea: Finite Element Analysis Approach*
Roboam Pebuar	Dr Mirzi Betasolo	MPhil/2	*Analysis and Modeling Engineering Methodology Applied to the Design and Reliability Assessment of Structures in Coastal Engineering*
Wesley Jacob Wambi	Dr Mirzi Betasolo	MPhil/2	*Understanding the Behaviour and Engineering Courses of Mudflow through Numerical Simulation Using GIS Applications and Implement Controls through Detailed Ground Survey Using GNSS Instrument and Applicable Geotechnical Modelling*
Jesmah Kepou	Dr Alak Kumar Patra	MPhil/1	*Investigation of Alternate Materials for Better Performance of Laminated Composites*
Depa Kutao	Dr Mirzi Betasolo	MPhil/1	*Effects of Extreme Precipitation and Flooding on Bridges and Culverts on the Highlands Highway*
Michelle Silip	Dr Alak Kumar Patra	MPhil/1	*Comparative Study on Natural and Artificial Core Materials for Advanced Composites*

Francis Martin	Dr Mirzi Betasolo	MPhil/1	*An Analysis of the Engineering Procurement and Contract Management in Papua New Guinea*

Final Year Undergraduate Research Projects

Fourth-year B.Eng. of Civil Engineering (Honours) students undertake research work for partial fulfilment of the Bachelor's degree program in 2024. Their research topics are shown in the Table below:

No.	Title	Summary / Scope of the project.	Name of Supervisor	Name of Students
1	*Assessment of Existing Building Infrastructures for Seismic Vulnerabilities in Lae City, Papua New Guinea*	Students will be able to conduct comprehensive assessments of existing buildings and infrastructure in Lae City to evaluate their seismic vulnerabilities and propose effective retrofitting strategies and structural improvements to enhance earthquake resistance	Ms. Grace Wantepe	Frank Garia, Lepani Giyomwanauri, Vaillie Haladei & Sean Lemeki
2	*Geosynthetic Solutions for Coastal Protection in Lae City, Papua New Guinea*	Students will be able to examine the potential applications of geosynthetics in coastal protection measures against erosion and sea-level rise in Lae City, Papua New Guinea, and evaluate the performance and suitability of different geosynthetic solutions for the local coastal environment	Ms. Grace Wantepe	Ranky Pindo
3	*Assessing Soil Stabilization and Waste Material Utilization for Sustainable Infrastructure in Morobe Province*	The core idea behind this research is to assess the geology of specific areas within Morobe Province, referred to as *problematic soil environments*, and evaluate their impact on civil infrastructure. The study focuses primarily on soils and their behavior, examining how different soil conditions influence the performance, stability, and durability of structures built in these areas.	Ms. Grace Wantepe	Matena Sangi
4	*Innovative Soil Improvement Techniques for Road Pavements along Yalu - Nadzab Four Lane Road Construction in Lae, PNG*	This project aims to optimize innovative soil improvement techniques—specifically soil stabilization and geosynthetic reinforcement—to enhance the performance and durability of pavements along the Yalu–Nadzab	Mr. Murray Konzang	Sheron Polyo and Martin Miok

		four-lane road in Lae, Papua New Guinea. The research will involve analyzing existing soil properties, testing various improvement methods, and providing practical recommendations for sustainable and resilient road construction in the region		
5	*Experimental Investigation on Composites of Selected Papua New Guinean Woods for Construction of Composite Structures*	The project involves a study of selected properties of Papua New Guinea (PNG) wood composites for their application in the construction of composite structures.	Dr. Alak Kumar Patra	Dibul Sil
6	*Kiunga to Aiambak Road Investigation and Design. A Case Study for Ok Tedi Mining Limited*	This research project focuses on assessing the viability of developing road and railroad transportation infrastructure along the Kiunga to Aiambak corridor. The study will consider key factors such as logistical efficiency, soil conditions, environmental impacts, construction and maintenance costs, and long-term sustainability.	Mr. Murray Konzang	McBride Matai and Morea Kurumop
7	*Water Supply and Sanitation in Rural Communities - Challenges and Solutions (A case of Busu/ Situm Block)*	This project encompasses site assessment and selection, demand calculations, and flow and pressure analysis. It also includes 3D modeling and flow simulation to achieve an optimized design for performance and efficiency.	Mr Roboam Pebuar	Giaveuga Dickson
8	*Hydrological Analysis & Hydraulic Design Analysis of collapsed Busu-Boana Bridge (Nawaeb District)*	The scope of the study is hydrological analysis and hydraulic gesign analysis of the collapsed bridge.	Ms. Stephanie Konts	Marlyn Nakara, Vinra Wampai & Vinnie Romba
9	*Investigation of River Bank Protection Using Geosynthetic Materials – Case Study of Situm River*	This project involves investigating the application of geosynthetic materials and structures for mitigating riverbank erosion. It includes computer-based analysis to evaluate the effectiveness and cost-efficiency of various geosynthetic solutions in addressing erosion-related challenges.	Mr. Roboam Pebuar	Mclaren Vengiau
10	*Nambut Village (Nawaeb*	This project focuses on the feasibility	Ms.	William Rere &

	District) Water Supply Design and Analysis-The Effects of Sedimentation Build up in a Gravity Fed Water Supply System	study and design of a gravity-fed water supply system, with particular emphasis on stream sedimentation assessment to support an improved and sustainable catchment design.	Stephanie Konts	Shane Ericho
11	*Analysis of the Behavior of Geosynthetic Reinforced Soil for Slope Stabilization between Young Creek and Kassam Top*	-	Mr. Roboam Pebuar	John Domi & Mark Elizah
12	*Analysis of the Behavior of Geosynthetic Reinforced soil for Slope Stabilization between Ramu-Madang Highway*	-	Mr. Murray Konzang	Andrew Jnr. Nere & Airu Arnold
13	*Assessment of Pavement Failure at the Connection between Rigid and Flexible Pavement at Wara Simbu Bridge*	This project involves an assessment of pavement failure at the junction between the National Highlands Highway's flexible pavement and the adjoining rigid pavement of the bridge. The study aims to identify the causes of structural distress and recommend engineering solutions to improve the durability and performance of the transition zone.	Mr. Roboam Pebuar	Dayvian Tinemau & Sinake Nolai
14	*Study on How Waves Impact the Infrastructures*	The student will assess the waves' impact to facilities (infrastructures, shorelines, etc). An actuator to generate waves will be developed using a 3D printer and trialed at the hydraulics lab.	Dr. Mirzi Betasolo	Nehemiah Muruhau
15	*Assessment of GSI (Geotechnical Seismic Isolation) Technologies to Mitigate Risk on Earthquake Vulnerable Building*	The student will assess a new material for geosynthetics that corresponds to low-cost sustainable earthquake-resistant construction technologies (GSI technologies)	Dr. Mirzi Betasolo	Wanpis Bill
16	*Assessment of Lae City Waste Treatment and Disposal Facility*	Assessment of the Lae City Waste Treatment and Disposal Facility located at the main wharf identifying possible improvement to the facility by conducting chemical tests, field survey and assessing the physical structure of the facility.	Mr. Willie Doaemo	Elizabeth Silih Noelyne Kelly
17	*Investigating into the Utilization of Mining*	Assesses the geotechnical properties of mining tailings, such as grain size	Mr. Murray Konzang	Charley Avediba &

	Waste Materials	distribution, compaction characteristics, shear strength, consolidation behavior, and permeability.		Mirriam Lengi
18	*Geosynthetic Solutions for Pavement Reinforcement and Stabilization of Existing Arifiran Section of the National Highlands Highway Road to Protect Against Flood-Induced Erosion*	Examine potential applications of geosynthetic solutions for the Flexible Pavement Reinforcement & Stabilization to protect against flood-induced erosion. Evaluate the performance of different geosynthetic solutions and their suitability for the surrounding envir	Mr. R. Pebuar	Joshua Karo & Hosea Wallum
19.	*Mitigation Strategy to Provide Access to Pedestrians of Lykapus and Waipakam from Kunap River*	This project provides a mitigation strategy by conducting feasibility studies and structural design analysis to optimize accessibility.	Dr. Mirzi Betasolo	Joshua Smith & Lincoln Tepi
20	*Failure Assessment and Design Proposal for the Collapsed Dumpu Bridge Along Ramu, Madang Province*	Assessing the hazards and mechanism causing the failure of the Dumpu Bridge and propose for a bridge design and/or preventive design measures for similar incidents around Papua New Guinea in the future.	Mr. Murray Konzang	Kelly Kopeap & Ronald Garry
21	*Investigation into Geosynthetic Pavement Stabilization using Geotextiles*	The project proposes a rehabilitation of the 2.0 km deteriorated road section of the Independence Drive Road at Ten City. This proposal emphasizes the idea of the usage of Geotextiles as reinforcements for road layers to produce durable and high-grade rigid pavements in tropical climates	Mr. Murray Konzang	Malachi Maso, Daniel Tom & Keymap Alphonse

SCHOOL OF ELECTRICAL AND COMMUNICATIONS ENGINEERING

Head of School: Dr. Joseph Fisher

Introduction

The School of Electrical and Communications Engineering offers both undergraduate and postgraduate programs. The undergraduate curriculum includes foundational courses in mathematics and physics, along with core subjects in either power engineering or communications engineering, as well as other required electives. Students can choose to specialize in one of two areas: Communications Engineering or Power Engineering. In their final year, students undertake research projects on various topics in electrical engineering. These projects allow students to demonstrate creativity and innovation through activities such as conducting research, building prototypes, developing simulation models, and presenting their work at the end of the academic year. The projects are designed to spark engineering curiosity and encourage the development of new methodologies, emphasizing the synergy between design and innovation as a driving force for engineering ingenuity.

Furthermore, the School of Electrical and Communications Engineering offers a thriving postgraduate program, which includes a Master of Philosophy (MPhil) by research, a Master of Science (MSc) in Communications Engineering by coursework, and a Doctor of Philosophy (PhD) program. The school proudly graduated one PhD student, one MPhil student, and one MSc student in the 2024 academic year. Currently, five candidates are enrolled in the PhD program, while eight students are pursuing Master's degrees—six in the MPhil program and two in the MSc program.

The School's research programs are continually evolving to keep pace with technological advancements. In response to the digital transformation, the Communications Engineering stream has initiated research in areas such as mobile and wireless networking, data communications, and Internet of Things (IoT) applications for Smart Cities. Additionally, the School is excited to introduce a new Computer Engineering stream, which will focus on microcontroller-based embedded systems design, big data analytics, robotics, and machine learning.

In light of global efforts to address climate change, the School's energy-related research is focused on developing innovative and sustainable energy solutions for the future. The integration of artificial intelligence into energy systems is expected to revolutionize renewable energy by enhancing its reliability, efficiency, cleanliness, and environmental sustainability. One major area of focus is the development of microgrid systems for off-grid and remote communities, addressing the critical issue of electricity access in Papua New Guinea (PNG), where approximately 80% of the 9 million population remains without power. Additionally, research on power systems includes improving the reliability of PNG's national power grids.

One of the School of Electrical and Communications Engineering's key priorities is the implementation and sustainability of academic staffing. The school aims to have approximately 70% of its full academic positions filled by national staff. Looking ahead over the next decade, the school is committed to ensuring that 90% of its national academic staff hold PhD degrees. This strategic focus is intended to foster strong research leadership both nationally and internationally through collaboration and capacity-building.

Further, the School of Electrical and Communications Engineering is embarking on establishing a Computer Engineering program. A complete syllabus has been prepared for the Bachelor of Electrical Engineering with Honors in Computer Engineering and submitted to the Academic Board. The course will empower graduates with the knowledge and skills to find better solutions to challenges in the design, construction, and maintenance of software and hardware components of computing and computer-controlled devices, equipment, and systems. The outcome of this course is to develop, prototype, and test microchips, circuits, processors, conductors, and any other component used in computer devices or systems (e.g. supercomputers, smartphones, laptops, servers, IoT gadgets, Artificial Intelligence applications, etc).

Through the commitment of its dedicated staff and students, the School of Engineering successfully achieved Provisional Accreditation in 2019, followed by Full Accreditation in 2024. These milestones reflect the hard work, perseverance, and shared vision of the school's exceptional team. In the same year, the School of Electrical and Communications Engineering established a collaborative partnership with Port Moresby Technical College, which specializes in Electrical Engineering. This partnership aims to provide alternative pathways for students to transition into the Electrical Engineering degree programs at the Papua New Guinea University of Technology. Port Moresby Technical College is the first institution to participate under this arrangement. The recent signing of a Memorandum of Understanding (MOU) between the two institutions marks a significant step in strengthening this initiative.

The school is also diversifying its program to offer world-class industry-certified Diploma and Advanced Diploma in Cisco Networking, and Huawei Networking, and currently working on the City & Guilds to offer Advanced Diploma in ICT and Engineering courses. The first batch of Cisco Advanced Diploma graduation was held in October 2024. These initiatives reflect the School of Electrical and Communications Engineering's dedication to staying at the forefront of technological advancements in meeting the evolving demands of ICT and Engineering sectors thus, driving the university's call for graduating world-class technocrats.

Our Vision

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

Our Values

In pursuit of our vision, we will be guided by the following values:

- Providing equal opportunity for education to students in Electrical and Communication Engineering through academic merit and character
- Developing and maintaining partnerships with industries, professional groups, and other educational and research institutions at both national and international levels
- Encouraging a climate of transparency, fairness, and cooperation among the staff members and the students
- Practicing sustainable use of resources
- Fostering an ethical workplace environment.

Academic Priorities

The major academic priorities are:

1. Integrate Research with teaching and learning
2. Connecting the academics with the community for its service
3. Make the teaching and learning process compatible with industry
4. Recruitment and retention of talented national and international academic staff.

Academic Staff Research Areas

Professor Paul Hoole	Artificial Intelligence in engineering systems, Sensors including antennas, Lightning engineering, electromagnetic signals in safety and security systems, and 5G/6G wireless technology for smart cities
Professor Kanthavel Radhakrishnan	Artificial Intelligence, Deep Learning, Big Data, Wireless Sensor Networks, High Performance Communication Networks, and Cloud Computing
Associate Prof. Ashish Luhach	Soft Computing, Networks, Sustainable Computing, and Cyber and Physical Systems

Dr. Joseph Fisher	Interactions of Lightning with Aircraft and Structures, Power System Analysis, High Voltage Engineering, Power Electronics and Machines, Renewable Energy, Transmission/Distribution Line Design, Energy Audit and Energy Efficiency Technologies
Dr. Ravindra Luhach	Digital Filters and VoIP, IOT, Electronics Engineering and Microwave and Radar
Dr. Sammy S. Aiau	Control Systems Engineering, Industrial Process Control, Electrical Power Systems, Renewable Energy (hydro, solar & wind), Smart Grids Energy Management, Virtual (Smart) Instrumentation Systems
Mr. Herman Kunsei	Adaptive Array Antenna Systems for 5G and 6G Networks, Electromagnetic Health Hazards, Propagation Measurements for Wireless Systems, Computer Network Security, Reliability in Networks, and Data Security
Mr. Gibson Kupale	Technical & non-technical losses in Power Systems, Power System Protections, Renewable energy systems, and Distributed Renewable Energy Generation. System Reliability & Security, and Field Excitation & Governor Control
Mr. David Chen	Big Data Processing, Compiler Design, Internet of Things, Wireless Networking and Signal Processing, Hardware Design, Data and Network Security, Business Process Modelling, Knowledge Management, and e-learning.
Mr. James Dugumari	Data Communications and Networks, Computer Architecture & Interfacing, and Computer Communication, Database, eCommerce and Inventory tracking applications
Mr. Joshua Yuanko	Optimization and Auto Scheduling Algorithms, Power Flow Control and Automatic Topology Reconfiguration, Power Systems Static and Dynamic Reliability, Grid Connected PV Plant Design and Modelling, Instrumentation and Microcontroller electronics

Postgraduate Research Areas

The major research areas pursued at the postgraduate level include:

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

Postgraduate Research

Student	Degree	Research Title	Status
Dr. Sammy S. Aiau	PhD	*Space Technology Based Renewable Energy Micro-grid System Evaluation for Papua New Guinea, Focusing on Markham District New Township Solar-Wind Renewable Energy Supply*	Graduated
Mr. David Chen	PhD	*Robotic Arm on Open-Source Platforms*	In progress
Mr. Gibson Kupale	PhD	*Challenges in PNG Electricity Network Security and Reliability Trends*	In progress
Mr. Herman Kunsei	PhD	*Using Perception ANN with Different Triggering Functions for Linear and Non-linear Array Arrangements*	In progress

Mr. Mathew Pua	PhD	*Power Quality Analysis of Grid-Connected Photovoltaic Systems in Distribution Networks using Machine Learning.*	In progress
Ms. Jacqueline Tantapua	PhD	*Interference Mitigation and Power Optimization in D2D Environments within 5G Networks.*	In progress
Mr. Mathew Choe Sapmangua	MPhil	*PNGUoT Wireless Fidelity Upgrade and Expansion.*	Graduated
Ms. Olive Antonio	MPhil	*Exploring the Potential for the Use of Biomedical Sensors and Electronic Health Records in Triaging in the Emergency Department in Papua New Guinea.*	In progress
Mr. Ernest Pokau	MPhil	*Design and Development of a Low- Cost Cellular Connected Quadplane for Maritime Applications in Manus Province, Papua New Guinea.*	In progress
Ms. Rani Maeoaka	MPhil	*Load Flow and Contingency Analysis of the Proposed Mongi-Burum Hydropower Infeed on Ramu Grid*	In progress
Mr. Elijah Kapma	MPhil	*Sustainable Energy Charging Station for Electric Vehicles in PNG*	In progress
Mr. Ken Wambi	MPhil	*Using Wireless Sensor Networks in Farms for Data Collection, Storage and Analysis to Enhance Agricultural Practices in Papua New Guinea.*	In progress
Mr. Kaias Moreo Bilgan	MPhil	*Remote Access of Critical Mobile Fleet Data Using Cellular Network and Modem – A case study of Ok Tedi Mining Mobile Fleets*	In progress
Mr. Benjamin Tigom	M.E.Comm. Eng	*Performance Analysis of Linear Equalizers on the Optical Downlink Dense Wave Division Multiplexing*	Graduated
Mr. Gau Taumaku	M. E. Comm. Eng	*Application of Advanced Technologies to Enhance the Resiliency of Smart Grids against Cyber and Physical Attacks.*	In progress
Mr. Terry Ricky	M. E. Comm. Eng	*Cyber Security Challenges in Smart Grids.*	In progress

Final Year Undergraduate Research

Student	Project title and brief abstract	Supervisor
Issac Sai	*Critical Fault Clearance Time Enhancement and the Stability of the PNG Power Bulk Electric System* This research project aims to investigate the impact of critical fault clearance time enhancement on the stability of the PNG Power Ramu Bulk Electric System.	Prof. Paul Hoole, Mr. Gipson Kupale, Prof. K. Pirapaharan, Prof. SRH Hoole and Dr. Joseph Fisher
Joseph Nomane	*Tracking of Mobile Phone Users in Smart Cities* In this research project, model of antenna radiation beam and its captured signal strength will be used to track a variety of mobile communication users in the congested scenario of a smart city.	Prof. P Hoole, Prof. K. Pirapaharan, Prof. SRH Hoole and Mr. Herman Kunsei
Andrew Nema	*Computer Data Base of Past Electrical Engineering Graduates in Papua New Guinea* This research project will seek to set up a computer data base for	Prof. Paul Hoole, Dr. Joseph Fisher, Mr. Herman Kunsei, Prof. K.

	women graduates from electrical engineering department and their career track.	Pirapaharan, Mr. Gibson Kupale and Prof. SRH Hoole
Jopi Taia	*Reliability of PNG Electric Power Grids and Initial Proposals to Improve Reliability* This research project will carry out basic reliability studies on two or more electric power grids in Papua New Guinea: The Ramu, NCD and Gazzele electric power grids.	Mr. Gibson Kupale, Prof. Paul Hoole, Dr. Joseph Fisher, Prof. K. Pirapaharan, Prof. SRH Hoole, and Mr. Herman Kunsei
Linclon Koropa	*3kW Battery Based Pico-Hydro Installations, Testing and Commissioning at Tambul District, Western Highlands Province* Pico-hydro power designs are suitable for off-grid standalone systems designed to power residential homes. For this pico-hydro project, the initial design, construction and installations are being done and tested.	Dr. Joseph Fisher & Mr. Wilson Kepa
Brian Titley & Emmanuel Torebena	*Grid-tie Battery-Based Hybrid Pico-Hydro and Photovoltaic Power System Design and Simulation* In this project, 1kW 3-phase synchronous generator at the power laboratory will be used to generate power at different voltage and frequency by varying the servomotor torque and DC excitation.	Dr. Joseph Fisher & Mr. Wilson Kepa
Jerry Harry & Mathew Kenny	*Pico-Hydro Feasibility Studies, Electrical and Mechanical Designs and Installations at Knogumul Village, Kerowagi District, Simbu Province* This is a community-based project at the mentioned location. In this project, pre-feasibility study and geotechnical survey was done.	Dr. Joseph Fisher
Bengklif Aris & Fittler Rime	*Design of a Cost Effective and Sustainable Up Hill Irrigation System for Rural Areas: Case Study Bena District, EHP* Irrigation is an ongoing problem in the fresh produce industry and FPDA strives to set up an irrigation system that would be simple, affordable and durable so that farmers can easily adopt the technology.	Dr. Joseph Fisher
Shane Bagani	*Robotic Paint Ball Shooter* Robotic paintball shooters can be programmed to precisely aim and shoot, leading to enhanced accuracy and efficiency compared to human-operated paintball guns.	Mr. David Chen
Manaseh Puruno	*Evaluating the Sustainability of Community WiFi Sites in Papua New Guinea* Community WiFi is an Internet infrastructure that provides Internet access to users in a community with wireless access in the last mile.	Mr. Herman Kunsei, Mr. Louis Kevin & Mr. Alex Roalakona
Anneliese Lo	*Remote Sensing of Solar Power Supply Systems* All electronic systems require some power source to operate. In remote and isolated areas of PNG, solar power has become the popular source of electricity for schools, clinics, homes, and electronic systems.	Mr. Herman Kunsei, Mr. Noel Mobiha (PNGCIR Department)
Gladestone Ulach	*Performance Analysis of Starlink Terminals in Rural Papua New Guinea* The Starlink network from SpaceX stands out as the only commercial LEO network with over 2M+ customers and more than 4000 operational satellites. In this paper, we conduct a first-of-its-kind extensive multi-faceted analysis of Starlink	Mr. Herman Kunsei

	performance leveraging several measurement sources.	
Isaiah Kaisom	*Improving Mobile Coverage on Karkar Island at the Physical Layer* Access to mobile technologies is transforming the daily lives of poor subsistence farmers in Papua New Guinea. However, the success of this access depends on infrastructure and where connectivity is poor there is evidence of a digital divide. Nevertheless, increasing affordability of internet access is helping to bridge the development gap.	Mr. Herman Kunsei
Gideon Masket	*Renewable Energy Integration* Design a system that integrates renewable energy sources (solar, wind, etc.) into the existing power grid, optimizing the power flow and ensuring stability.	Mr. Gibson Kupale
Mauro Jetori	*Power Quality Improvement* Explore and develop methods to improve power quality, addressing issues such as voltage sag, swell, harmonics, and transient disturbances in electrical systems.	Mr. Gibson Kupale
Elizah Junior Apollo	*Microgrid Design and Optimization* Design a microgrid that can operate independently or in conjunction with the main power grid, focusing on reliability, sustainability, and resilience.	Mr. Gibson Kupale
David Issac	*Power System Stability Analysis* Perform a comprehensive analysis of power system stability, considering factors like transient stability, voltage stability, and frequency stability.	Mr. Gibson Kupale
Francis Kaupa & Francis Tepori	*Energy Management Systems for Buildings* Design an energy management system for optimizing power consumption in buildings, incorporating smart sensors, automation, and demand-side management.	Mr. Gibson Kupale
Elizabeth Oa Bal	*Microcontroller based Staff and Visitor Management System for the Unitech Administration Building* This project is aimed at designing a microcontroller-based visitor and staff management system. Via keypad and/or toggle switches, the visitor will input the defined numerical staff code and initiate a call.	Mr. Wilson Kepa
Mr. Claude Tetu	*Implementation of Solar-Powered Ice Flacking Machine for Aquaculture and Inland Fisheries in Coastal Provinces of Papua New Guinea (PNG)* Access to reliable and affordable ice for fish preservation is crucial for maintaining product quality and extending shelf life, particularly in remote coastal areas where modern cooling methods are limited or unavailable.	Mr. Isaiah Koldai & Dr. Joseph Fisher
Tony Haggai Ararua	*Introducing Photovoltaic (PV) Systems to Replace Wood- Fired Cocoa Drying Process in Papua New Guinea (PNG)* *Conducting this research to address the underlying issue and present the advantages of transitioning from traditional wood-fired cocoa drying methods to PV systems in PNG.*	Mr. Isaiah Koldai & Dr. Joseph Fisher
Danstan Kule	*Design of Renewable Energy-Based Microgrid to Enhance Rural Electrification in Papua New Guinea (PNG)* By leveraging renewable energy sources such as solar, wind, and hydroelectric power, this research seeks to address energy	Mr. Isaiah Koldai & Dr. Joseph Fisher

	poverty while promoting sustainability.	
Zochobert Inni	*Smart Farming System Using Sensors for Agricultural Task Automation* A novel methodology for smart farming by linking a smart sensing system and smart irrigator system through wireless communication technology is paramount.	Mr. Mathew Pua
McDonald Luta & Christopher Rake	*Pico-Hydro System Project of a Rural Area* Pico hydropower (PHP) is a small power plant system to generate electricity that is suitable for implementation in the rural area.	Mr. Mathew Pua
Jonathan Malakai	*Automatic Transfer Switch Using Programmable Logic Controller* To ensure continuous operation of the load, the Automatic Transfer Switch (ATS) is used to transfer the load among several power sources.	Mr. Mathew Pua
Iso Peter	*Analysis of the Electric Loads of Residential and Public Buildings in Urban Power Supply Systems* Accurate determination of the calculated electric loads is a basis for power supply systems design. Values of the calculated loads influence parameters of the electrical grid.	Mr. Mathew Pua
Leka Vagi	*Mathematical Model of Active and Reactive Power Control System for Grid tied, 1200kW, Power Inverter* Power inverter is a central equipment (or technology) used in the applications such as PV Electric Power Generation, Variable speed control of electric motors in industries.	Mr. Joshua Yuanko
Joseph Raire	*Inventory Database for ECE Department Storeroom* The database will track consumables, tools, equipment and spare parts kept within the stores. The software application for the Inventory Database will be developed using Microsoft Access and Visual Basic Programming Software.	Mr. Joshua Yuanko
Mathew Momak	Off-*Grid Solar Power System for Tewai Siasi District, Morobe Province, Papua New Guinea* Solar power works by converting energy from the sun into power. Solar energy stands as one of the most promising sources of renewable energy, and harnessing this infinite power source effectively is pivotal for a sustainable future.	Dr. Sammy S. Aiau
Bingmalu Serum & Yangobing Yana	*Wind Power System for Gagidu and Sialum Townships, Finchaffen District, Morobe Province, Papua New Guinea* Wind power generation is one of the most mature and promising power generation methods for large-scale commercial development. Wind power generation has the advantages of being clean and pollution-free, low power generation cost, less actual land occupation and simple operation.	Dr. Sammy S. Aiau
Dan Benson & Everah Kuimb	*Hydropower System for Bundi High School, Bundi District, Madang Province, Papua New Guinea* Hydropower plants are a vital energy source using water to generate electricity throughout the world There are various types of hydropower systems depending on the head and flow rate of water.	Dr. Sammy S. Aiau

Jasmine Norman & Mea Maba	*Solar and Wind Smart-Grid Power System – Laboratory Project* Smart grids are electricity network that use digital technologies, sensors and software to better match the supply and demand of electricity in real time while minimizing costs and maintaining the stability and reliability of the grid.	Dr. Sammy S. Aiau
Bonny Bares & Enely Alex	*Hydropower System for Hawa Correctional Institute Service (CIS), Tagali LLG, Tari-Pori District, Hela Province, Papua New Guinea* Hydropower plants are a vital energy source using water to generate electricity throughout the world There are various types of hydropower systems depending on the head and flow rate of water.	Dr. Sammy S. Aiau
Joel Iamo	*Data Science – Music Store Analysis and Visualizations using SQL & Tableau* Data Science is an emerging field and almost every company nowadays needs a candidate who has exact knowledge in this field. Studying Data Science allows you to manage various tasks such as collecting numerous sets of data, validating data, analyzing data, etc.	Assoc. Prof. Ashish Luhach
Joe Torohune	*Energy Efficiency Investigation in Data Collection Wireless Sensor Networks Energy-Efficient MAC Protocol for IoT Devices* This dissertation will study the problem of energy efficiency in resource constrained and heterogeneous wireless sensor networks (WSNs) for data collection applications in real-world scenarios.	Dr. Hikma Shabani
Ms. Norelle Malala	*Development of an Adaptive Traffic Light and Pedestrian Warning System for Urban Traffic Management* The optimization of traffic light controller in a city using microcontroller will be studied and a multiple traffic light control and monitoring system will be developed in order to reduce possibilities of traffic jams, caused by traffic lights, to an extent.	Dr. Hikma Shabani
Mr. Vincent Nanai	*Optimizing Security and Power Efficiency in Multi-Antenna Relays with Hybrid Beamforming* Beamforming will be used by the relay to prevent the eavesdropper from intercepting confidential information. For the purpose of maximizing the secrecy rate, antenna grouping and beamforming vectors will be designed.	Dr. Hikma Shabani

Journal Articles Published

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Reddy, K.H.K., Goswami, R.S., Luhach, A.K., Chatterjee, P., Alnumay, M. & Roy, D.S. (2024). EFLSM: An Intelligent Resource Manager for Smart City's Fog Layer Service Management, *IEEE Transactions on Consumer Electronics*, 70(1), 2281 – 2289. https://dx.doi.org/10.1109/TCE.2024.3376961

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Asirvatham, D., Gonzalez-Longatt, F. M., Falkowski-Gilski, P., & Kanthavel, R. (Eds.). (2024). *Evolutionary artificial intelligence: Proceedings of ICEAI 2023* (582 pages). Springer.

Kanthavel, R., & Dhaya, R. (Eds.). (2024). *AI for large scale communication networks* (534 pages). IGI Global.

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Galgal, K. N., Muduli, K., & Luhach, A. K. (2024). Machine learning approach to predicting reliability in health care using knowledge engineer. In S. Kumar, A. Sharma, N. Kaur, L. Pawar, & R. Bajaj (Eds.), *Optimized predictive models in health care using machine learning* (pp. 300–316). John Wiley & Sons.

Shabani, H. (2024). Finite difference time domain method to investigate electromagnetic field variation in large-scale networks. In R. Kanthavel & R. Dhaya (Eds.), *AI for large scale communication networks* (pp. 155–196). IGI Global. https://doi.org/10.4018/979-8-3693-6552-6.ch008

Srilakshmi, R., Choudhary, S., Raja, R., & Luhach, A. K. (2024). Syndrome detection unleashed: Computer vision applications in neurogenetic diagnoses. In S. Choudhary, S. Kumar, S. Gowroju, M. Gulhane, & R. Sri Lakshmi (Eds.), *Genomics at the nexus of AI, computer vision, and machine learning* (pp. 25–58). Scrivener Publishing & John Wiley & Sons.

Conference Papers and Presentations

Das, R. P., Muduli, D., & Luhach, A. K. (2024, March 1–2). An investigation into the practical use of Internet of Things technology in smart city applications. In *Proceedings of the 2024 1st International Conference on Cognitive, Green and Ubiquitous Computing (IC-CGU)* (pp. 1–6). IEEE. https://doi.org/10.1109/IC-CGU58078.2024.10530777

Kumar, M., Kumar, S., Luhach, A. K., & Tiwari, A. (2024, December 6–7). Advancements in waste segregation through machine learning and integrating AI for sustainable waste management. In *Proceedings of the 2024 13th International Conference on System Modeling & Advancement in Research Trends (SMART)* (pp. 328–334). IEEE. https://doi.org/10.1109/SMART63812.2024.10882258

Mbulayi, O., Zero-Faray, N. M., Ngangudila, J. M., Kabeya, P., & Shabani, H. (2024, November 26–27). A multi-faceted approach of natural language processing and machine learning for skills matching. Paper presented at *TIM'24: 7th International Conference on Information Technology and Modeling*, Faculty of Sciences Ben M'Sik, Casablanca, Morocco.

Shabani, H., Fisher, J., Hoole, P. R. P., & Ahmed, M. M. (2024, July 1–4). Smart car road obstacles avoidance system based on Arduino Uno. Paper presented at *7th National Science and Technology Conference*, Papua New Guinea University of Technology, Lae, Papua New Guinea.

SCHOOL OF MECHANICAL ENGINEERING

Head of School: Dr. Kamalakanta Muduli

Introduction

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

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

Focused Research Areas

The school has a focus on the following areas of research in mechanical engineering:

i. Design and Manufacturing
ii. Computer-Aided Design and Engineering Modeling
iii. Energy and Environment
iv. Control Engineering and Mechatronics
v. Materials Characterization
vi. Engineering Education and Management
vii. Computational Fluid Dynamics (Single-phase & Multi-phase Flows, Turbulence Modelling)

The school encourages faculty to conduct their research by concentrating and focusing on the above areas.

Faculty Research Interests

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

No.	Staff Members	Research Areas
1.	Prof. Nicholas Lambrache	3D Computer-Aided Design, Engineering Modeling, Robotics, Mechatronics, Materials Science, Experimental Engineering
2.	Dr. Kamala K. Muduli	Operations Management, Decision sciences, Machining, Sustainable Development, Health Care, Waste Management, and Ergonomics
3.	Dr. Aezeden Mohamed	Corrosion Engineering, Machine Design, Non-Destructive Technologies, Biomedical Engineering, Failure Analysis, Materials and Manufacturing processing, Engineering Education

4.	Dr. Shoeb Ahmed Syed	Numerical Modeling, Computational Fluid Dynamics and Heat Transfer, Combustion, Fluid-Structure Interaction, Turbulence, 2 or 4 Stroke Reciprocating Engines, Renewable Energy
5.	Dr. Jack Khallahle	Computational Fluid Dynamics, Thermodynamics, Thermal Power Systems, Heat Transfer, Engineering Economics, Engineering Noise Control and Machine Design
6.	Dr. Steve Ales Korokan	Materials Science & Engineering: Friction Stir Welding (FSW) Al-Al and Al-high Temperature Alloys; Smart Materials and other Alloys, Design, and Manufacturing; Production of Fiber-reinforced Polymer Composites, Renewable Energy - Geothermal, Bio, Wind, and Solar - and Energy Policy
7.	Dr. Bikash Ranjan Moharana	Welding, Mechanical and Metallurgical Analysis, Process Optimization, Advanced Machining Processes, and Sustainable Manufacturing Technology
8.	Dr. Khazar Hayat	Mechanical Design, Composite Materials & Structures, Multiscale Analysis, Structural Health Monitoring (SHM), Renewable Energy Technologies
9.	Mr. Brian N'Drelan	Renewable energy – Solar, Tidal, and Wind. Failure of Components and Systems in Alluvial Mining Engineering, Experimental Engineering, and Operations Management

UNDERGRADUATE RESEARCH PROJECTS

The following projects were completed by final-year Mechanical Engineering students in the academic year 2023–24 as part of the partial fulfillment of the requirements for the Bachelor's Degree in Mechanical Engineering:

#	**Project Titles**	**Supervisors**	**No. of Students**
1	*Health Monitoring Platform for Mining Applications - Wear of High Contact Machinery*	Brian N'Drelan	1
2	*Hydraulic Mechanism for Rubbish Collection Vehicles for Unitech Maintenance Services*	Brian N'Drelan	2
3	*Acoustical Approach to Basement Carpark Ventilation Exhaust Duct System Design, Fan & Silencer Selection for Sandover Building at PNG Unitech*	Dr. Jack Khallahle	2
4	*A Numerical Study Flow Variables in Stratified Two-Phase Gas-Oil Flow in a Horizontal 2D Pipe*	Dr. Jack Khallahle	2
5	*A Numerical Study of Flow Variables of a Fully Developed Gas Flow Over Stationary Oil Surface in a Horizontal 2D Pipe*	Dr. Jack Khallahle	2

6	*Fracture Toughness Assessment of Welded Alloys*	Dr. Steve Ales	2
7	*Design of a Solar Desalination Plant*	Dr. Shoeb Syed	2
8	*Design of Unitech Mess Bio-Digester Plant*	Dr. Shoeb Syed	2
9	*Generation of Bio-diesel and Study of its Characteristics*	Dr. Shoeb Syed	2
10	*Design of Hydro Turbine Size for ATCDI Building*	Dr. Shoeb Syed	2
11	*Evaluation of Tensile Strength of a Hybrid Joined Steel Assembly*	Dr. Kamalakanta Muduli	2
12	*Design and Fabrication of a Pyrolysis Reactor*	Dr. Kamalakanta Muduli	2
13	*Solar Still: A Sustainable Approach for Water Desalination.*	Dr. Bikash Moharana	2
14	*Evaluation of Mechanical Properties of Fusion Welding Processes for Similar Weldment*	Dr. Bikash Moharana	2
15	*Design and Fabrication of Plastic Melter for Production of Plastic Pavement Bricks or Floor Tiles*	Dr. Albert Ude	2
16	*Characterization of Betel Nut Fiber/fly-Ash Hybrid Composite for Industrial Applications - Mechanical & Wear Test*	Dr. Albert Ude	2
17	*Ocean Wave Energy Converter Harnessing the Power of the Pacific Ocean on PNG Coastlines*	Dr. Aezeden Mohamed	2
18	*Hydroponics in Urban Areas of Papua New Guinea*	Dr. Aezeden Mohamed	1
19	*Kalekapana Water Plant Distribution System*	Dr. Aezeden Mohamed	3
20	*Redesign of a Vibrating Dewatering Screen for Simberi Gold Mine SAG Mill*	Dr. Aezeden Mohamed	2
21	*Agro Smart Waste Management Design System for Unitech*	Dr. Aezeden Mohamed	2
22	*Preventative Maintenance Schedule for Carton Erector for SP Brewery*	Dr. Aezeden Mohamed	2
23	*Long term Salt Management Project for Hides Gas Conditioning Plant*	Dr. Aezeden Mohamed	1
24	*Implementation of Preventive Maintenance System in Carton Sealer in SP Brewery*	Dr. Aezeden Mohamed	2
25	*Implementation of a Mini Wet Mill for Smallholders Coffee Production*	Dr. Kamalakanta Muduli	1
26	*Sound Control of a 5 Degrees of Freedom Robotic Arm*	Prof. Nicholas Lambrache	3
27	*Reciprocating Wire Power Transmission for Small Water Wheels*	Prof. Nicholas Lambrache	2

Postgraduate Students Research

The following projects are being conducted by the Postgraduate Students:

#	Research Projects	Supervisors	Status	PG Student
1	*Failure of Components and Systems in Alluvial Mining Engineering*	Prof. Nicholas Lambrache	In-progress	Brian N'Drelan (PhD)
2	*Digital Technology Enabled Maintenance Practices for Enhanced Sustainable Organizational Performance: Myth or Reality?*	Dr. Kamalakanta Muduli and Dr Shoeb Ahmed Syed	In-progress	Granville Embia (PhD)
4	*Implementing IoT and Automation for Quality Control in Beverage Industries: A Comprehensive Approach to Fill Level Inspections and Early Alert System*	Dr. Kamalakanta Muduli	In-progress	Sachhi Nero (MEngg)
5	*Assessment of Weld Integrity on Mild Steel*	Dr. Steve Ales	In-progress	Max Aiso (MEngg)

Journal Articles Published

Attar, S., & Hayat, K. (2024). Effective utilization of unidirectional laminates for mass reduction in composite blades of multi-MW wind turbines. *Advanced Composite Materials*, 1–18. https://doi.org/10.1080/09243046.2024.2438470

Behera, B. C., Mohamed, A., & Muduli, K. (2024). Eco-Friendly Machining of Ni-Based Superalloy with High-Velocity Mist Nozzle. *Engineering Proceedings*, *66*(1), 33. https://doi.org/10.3390/engproc2024066033

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Darsin, M., Ramadhan, I. F., Sumarji, S., Dwilaksana, D., Sutjahjono, H., & Ales, S. K. (2024). Hardness and microstructure of FDM 3D printed parts using self-made PLA-brass filaments. *SINERGI*, *28*(3), 433–450. https://doi.org/10.22441/sinergi.2024.3.001

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Embia, G., Muduli, K, & S. A. Syed. (2024). Advanced condition monitoring practices for improving plant reliability. *Interdisciplinary Journal of Papua New Guinea University of Technology*, *1*(1), 14–40.

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Mai, M., Mohamed, A., Deepak, B. B. V. L., & Woya, J. (2024). Design and Optimization of the Aircraft's Rear Fuselage for Predictive Fatigue Failure. *Engineering Proceedings*, *66*(1), 38. https://doi.org/10.3390/engproc2024066038

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Mishra, D., Mohapatra, B., Satpathy, A. S., Muduli, K., Mishra, B., Mishra, S., & Paliwal, U. (2024). The pandemic COVID-19 and associated challenges with implementation of artificial intelligence (AI) in Indian agriculture. *International Journal of System Assurance Engineering and Management*, *15*(6), 2715–2729. https://doi.org/10.1007/s13198-024-02293-z

Panigrahi, R. R., Singh, N., & Muduli, K. (2024). Digital technologies and food supply chain: A scoping view from 2010 to 2024. *International Journal of Industrial Engineering and Operations Management*. https://www.emerald.com/insight/content/doi/10.1108/IJIEOM-05-2024-0030/full/html

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Sushma, S., Mani, R., Perumalraja, R., Vasanthan, R., & Mohamed, A. (2024). Accounting Information Systems for Strategic Management: The Role of Intellectual Capital in Mediating the Relationship between Customer, Company, and Performance. *Indian Journal of Information Sources and Services*, *14*(2), 160–166. https://doi.org/10.51983/ijiss-2024.14.2.23

Swain, S., & Muduli, K. (2024). Uncovering the issues associated with AI and other disruptive technology enabled operational practices in healthcare sectors in India. *Recent Patents on Engineering*, *18*(5), 49–65. https://doi.org/10.2174/1872212117666230213113845

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Chhotaray, P., Behera, B. C., Moharana, B. R., Muduli, K., & Sephyrin, F. T. R. (2024). Enhancement of manufacturing sector performance with the application of Industrial Internet of Things (IoT). In B. C. Behera, B. R. Moharana, K. Muduli, & S. M. N. Islam (Eds.), *Smart technologies for improved performance of manufacturing systems and services* (pp. 1–19). CRC Press.

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Madapana, K., Rath, K. C., Rao, N. V. J., Panda, L. P., Das, S., Muduli, K., & Palaninatharaja, M. (2024). Quantum robotics: Towards intelligent and adaptive robotic systems. In A. Khang & K. C. Rath (Eds.), *The quantum evolution: Application of AI and robotics in the future of quantum technology* (pp. 47–74). CRC Press.

Raj, A. K., Moharana, B. R., & Bal, K. S. (2024). A review of TIG welding processes: Experimentation and finite element analysis for sustainable operational practices. In K. Muduli, S. K. Rout, S. Sarangi, S. M. N. Islam, & A. Mohamed (Eds.), *Evolutionary manufacturing, design and operational practices for resource and environmental sustainability* (1st ed., pp. 267–279). John Wiley & Sons. https://doi.org/10.1002/9781394198221.ch23

Edited Books

Moharana, B. R., Behera, B. C., & Muduli, K. (Eds.). (2024). *Digital technology enabled circular economy: Models for environmental and resource sustainability.* CRC Press. https://doi.org/10.1201/9781003349877

Muduli, K., Rout, S. K., Sarangi, S., Islam, S. M. N., & Mohamed, A. (Eds.). (2024). *Evolutionary manufacturing, design and operational practices for resource and environmental sustainability.* John Wiley & Sons. https://doi.org/10.1002/9781394198221

Satapathy, S., & Muduli, K. (Eds.). (2024). *Advanced computational methods for agri-business sustainability*. IGI Global. https://www.igi-global.com/book/advanced-computational-methods-agri-business/336470

Thanigaivelan, R., Krishnan, P. K., Muduli, K., & Tamang, S. K. (Eds.). (2024). *New materials, processing and manufacturability: Fabrication and processing of advanced materials.* John Wiley & Sons. https://doi.org/10.1002/9781394212736

Memorandum of Understandings (MOUs)

#	Titles
1	Ongoing collaborative research work with University of Malang, Indonesia entitled "Preparation of Aluminum Based Metal Matrix Nanocomposites Various Application in Corrosive Environment"; project duration: 1 year (October 2024-October 2025)
2	Ongoing collaborative research work with University of Malaysia Approach in Biofuel Production from Copra Meal (CM)"; project duration: 2 years (2023 to October 2025)

SCHOOL OF MINING ENGINEERING

Head of School: Dr Jim Lem

The School of Mining is one of the four schools within the Faculty of Engineering at the Papua New Guinea University of Technology. It offers two undergraduate degree programs: the Bachelor of Mining Engineering (Honours) and the Bachelor of Mineral Processing Engineering (Honours). In addition to these, the school provides postgraduate programs in Mining and Mineral Processing Engineering. These postgraduate programs are primarily research-based and include the Master of Philosophy (MPhil) and Doctor of Philosophy (PhD) degrees. To date, the number of top graduates who did post graduate studies and took up academic positions in the school are few. Our graduates have had high preferences for employment in the industries owing to the far superior salaries and other benefits offered particularly by mining resources and energy industries. This has seen less output in researches in the school over the years owing largely to lean academic staff strength that are often overloaded with teaching duties.

The School of Mining is the only academic School at the University with 99.9% of its academic staff being Papua New Guinean nationals. Among them, 75% hold PhD qualifications, while the remaining staff members possess master's degrees and bring over 15 years of combined industry experience. The academic team is well supported by experienced technical staff with expertise in mining, mineral processing, extractive/resources engineering, resource geology, and mining environments.

Since 2022, the School has also engaged external experts through adjunct professorships and online part-time lectureships to complement its in-house academic capacity. Notable contributors include Professor Ernest Baafi, Associate Professor at the University of Wollongong (Australia); Dr. Elaine Wightman of Queensland University; and Dr. Clara Abuntori and Mr. Emmanuel Buaba from the University of Mines and Technology (Ghana). Dr. Wightman is particularly involved in the supervision and co-supervision of postgraduate students. In addition, the School regularly invites practicing engineers from the mining industry to deliver lectures in the form of Master Classes, further enriching the students' learning experience with real-world perspectives.

In 2023, we received good number of applications for Master of Philosophy in mining and mineral processing engineering. Almost 65% of these applicants are practicing engineers working in various mines in Papua New Guinea such of Ok Tedi, K92 thereby increasing our research activities in the school. In 2024, we enrolled 2 more Master of Philosophy candidates. Currently, we have up to ten (10) students enrolled in Master of Philosophy in the School embarking on research in various areas in mining, mineral processing, hydrometallurgy, environment and other core related areas. Most of these research projects are industry based technical challenges projects.

Moreover, the School of Mining continues to enjoy healthy industry partnerships and collaborations thereby propelling staff and students to engage in real-industry-based research projects and consultancies.

The School of Mining has running MOUs with industry partners such as K92 Gold Mine, Mineral Resources Authority (MRA) as well as local alluvial resources landowners. It also fosters international research collaborations with University of Queensland (Australia), UNSW, Sydney, Harvard University, Cambridge as well as James Cook University.

Research Focus Areas

Our researches cover wide spectrum of areas but majority are technical challenges projects with focus on meeting industry needs. Our research strength is in the areas of mining or mineral resources extraction, resources evaluation, process design and optimization, comminution, process mineralogy as well as environmental solutions to mining-related waste and safety.

The main focus areas are;

1. **Mining Engineering**
   - Mining Production Optimization
   - Geological Modelling and Evaluation of Uncertainties
   - Engineering Geology

- Geomechanics and Rock Mass Deformation and Behavior
- Alluvial Mining Techniques and Resources Evaluation
- Innovative Solution to Acid Rock Drainage (ARD) Associated with Mining Wastes
- Mineral Economics
- Mineral Taxation Policy
- Underground Mining Methods and Optimization
- Ore Reserve Estimation
- Rock Slope Stability Analysis

2. Mineral Process Engineering

- Process Mineralogy
- Comminution (including grindability)
- Froth Flotation Fundamentals
- Application of Froth Flotation
- Hydrometallurgy of Gold and Base Metals – Copper, Nickel, Chromium, Cobalt, etc.
- Process Plant Design & Optimization
- Froth Flotation of Base Metal Sulphides and Gold
- Process Data Analysis and Statistical Modelling
- Processing of Industrial Minerals
- Mine & Mill Waste Management
- Alluvial Gold Extraction, Process Optimisation with Focus on Fine Gold Recovery and Elimination of Mercury (Hg)
- Gravity Concentration of Gold
- Gravity Concentration of Beach Sand Minerals
- Physical Processing of Beach Sand Minerals
- Pyrometallurgy
- Recovery of Rare Earth Elements (REE)
- Reprocessing of Mill Tailings

Research Collaborations

With Harvard University:

The School of Mining at Papua New Guinea University of Technology (PNG Unitech) has partnered with Harvard University on a groundbreaking research initiative focused on the chemical analysis of spherules recovered from the Pacific Ocean, believed to be remnants of the CNEOS 2014-01-08 (IM1) bolide—an interstellar object that impacted Earth in 2014. This collaborative effort involves advanced geochemical techniques and mineralogical classification to determine the origin, composition, and possible extraterrestrial nature of the recovered particles. Researchers from both institutions are working jointly to analyze these spherules, using cutting-edge instrumentation to explore their elemental makeup, structural features, and isotopic signatures. The collaboration not only enhanced the research capabilities of PNGUoT but also places the institution at the forefront of planetary science and impact geology in the Pacific region. It exemplifies the School of Mining's commitment to global scientific engagement and interdisciplinary research addressing questions of planetary origin, material science, and geological processes.

With Curtin University:

This research project, titled *"Progressive Taxation for Extractive Industries: Reconciling the Progressive Mineral Taxation Regime of Papua New Guinea"*, was the result of an international academic collaboration between the PNGUoT and Curtin University, Australia.

The lead researcher, Ken Ail of PNG UoT, with two experts from Curtin University: Dr. Daniel Packey of the Curtin Business School (Bentley Campus, Australia) and Professor Bryan Maybee from Curtin University's Singapore Campus collaboratively brought together regional insight into Papua New Guinea's resource sector with international expertise in mineral economics and fiscal policy design. Curtin University's contribution was

instrumental in providing methodological guidance, particularly in applying fiscal evaluation tools such as the Stroup Index and Lorenz concentration curves, and in shaping the theoretical framework surrounding progressive taxation systems. The university also facilitated access to comparative policy models and provided oversight during the development of financial simulations using both hypothetical and real mining data. This collaboration highlights the value of cross-border academic partnerships in addressing complex policy challenges in resource-rich developing economies. It also reflects a shared commitment to advancing equitable and efficient fiscal systems that support sustainable development.

Current Staff Research

Staff	Project title
Brian Nokondopa & Dr. Wilson Kobal	*Reducing Cyanide Consumption in Leaching of Gold-Silver Ore Using Cyanide-Glycine Synergistic Leaching*
Tera, J., Prof. Prasanna Kumar Y & Dr. Jim Lem	*Removal of Heavy Metal Pollutants from Aqueous Solutions Using Waste Material as Biosorbents*
Francis Kisai, & Dr. Jim Lem	*Studies of Aggregates from PNG: Materials from Bumbu, Busu & Yalu Rivers of Morobe Province*
Dekba, Y., Dr. Arpa, G., Dr. Wightman, E., & Dr. Jim Lem	*Formation Mechanism, Ore Genesis and its Implication on the Milling and Recovery Processes, and the Environment, of the Mt Bai Porphyry Copper Gold Deposit in Rai Coast, Madang Province, Papua New Guinea.*

Postgraduate Research

The research topics, supervisors, sponsors/funding sources are presented below:

Student	Research Topic	Funding Source	Supervisor
Mr. Mondu Akura*	*Hydrometallurgical Extraction of Gold in the K92 Gold Ore*	GAP	Dr. J. Lem
Michelle Maiti	*Recoverable Gold Loss Through TPP Plant – OK Tedi*	OTML	Dr. J. Lem, Dr. Elaine Wightman
Francis Kisai*	*Evaluation of Aggregate Quality*	self	Dr. J. Lem
Peter Pia	*Hydrometallurgy of Gold in K92 Mill Tailings*	GAP	Dr. J. Lem, Dr. Elaine Wightman
Brian Nokondopa	*Reducing Cyanide Consumption Using Cyanide-Glycine Solution as Lixiviant in Leaching Silver-Gold Concentrate and Tail*	GAP	Dr. W. Kobal, Dr. J. Witne
Enopa Marbieng	*Optimizing Collector Dosage – K92 Operation*	K92 Mine	Dr. J. Lem, Dr. W. Kobal
Joseph Tera	*Removal of Heavy Metal Pollutants from Aqueous Solutions Using Waste Material as Biosorbents*	LNSDC	Prof. Prasanna & Dr. J. Lem
Awame Kobe	*Metallurgical Characterization of Frieda Copper Ore: Reagent Screening*	Self	Dr. J. Lem

** Finalizing MPhil thesis*

Journal Articles

Ail, K.K. (2023). Predictive Analysis of Major Copper and Gold Mining Projects in Papua New Guinea. *International Journal of Innovative Science and Research Technology*, *8* (9), 373-389. https://doi.org/10.5281/zenodo.8355332

Loeb, A., Jacobsen, S.B., Tagle, R., Adamson, T., Bergstrom, S., Cherston, J., Cloete, R., Cohen, S., Domine, L., Fu, H., Hoskinson, C., Hyung, E., Kelly, M., Lard, E., Laukien, F., Lem, J., McCallum, R., Millsap, R., Parendo, C., Peddeti, C., Pugh, J., Samuha, S., Sasselov, D.D., Schlereth, M., Siler, J., Siraj, A., Smith, P.M., Taylor, J., Weed, R., Wright, A., & Wynn, J. (2024). Chemical classification of spherules recovered from the Pacific Ocean site of the CNEOS 2014-01-08 (IM1) bolide. *Chemical Geology*, *670*, 122415. https://doi.org/10.1016/j.chemgeo.2024.122415

Loeb, A. Adamson, T. , Bergstrom, S., Cloete, R., Cohen, S., Conrad, K., Domine, L., Fu, H., Hoskinson, C., Hyung, E., Jacobsen, S. B., Kelly, M., Kohn, J., Lard, E., Laukien, F., Lem, J., McCallum, R., Millsap, R., Parendo, C., Pataev, M. I., Peddeti, C., Pugh, J., Samuha, S., Sasselov, D. D., Schlereth, M., Siler, J., Siraj, A., Smith, P. M., Tagle, R., Taylor, J., Weed, R., Wright, A., & Wynn, J. (2024). Recovery and classification of spherules from the Pacific Ocean site of the CNEOS 2014-01-08(1M1) Bolide. *Research Notes of the American Astronomical Society*, *8*(1), id.39. https://doil.org/10.3847/2515-5172/ad2370

Wilson, K., Pepper, R.A., Alarco, J.A., Martens, W., & Couperthwaite, S.J. (2024). Valorisation of acid mine drainage waste for synthesis of ferric ammonium sulfate (FAS), *Minerals Engineering, 205*, 108462. https://doi.org/10.1016/j.mineng.2023.108462

Article Preprints

Ail, K. K. (2024, November 10). Analysing the Performance of Mineral Tax Instruments of Papua New Guinea. http://dx.doi.org/10.2139/ssrn.5015753

Ail, K. K., Daniel, P., & Bryan, M. (2024, September 02). Progressive Taxation for Extractive Industries: Summary of a Thesis on Reconciling the Progressive Mineral Taxation Regime of Papua New Guinea. http://dx.doi.org/10.2139/ssrn.4943820

FACULTY OF HUMANITIES

SCHOOL OF BUSINESS STUDIES

Head of School: Dr. Adimuthu Ramasamy

Introduction

The School of Business Studies (SBS) is the largest of the thirteen academic schools at the Papua New Guinea University of Technology (PNGUoT), serving over 700 undergraduate and postgraduate students annually. These include Ph.D., M.Phil., Executive MBA (EMBA), and MBA students. SBS is a multidisciplinary school with a strong track record of producing national and Pacific regional leaders who have significantly contributed to both the private and public sectors for decades.

The school offers several undergraduate programs, including the Bachelor of Business in Accounting (BBAC), Applied Economics (BBAE), Information Technology (BBIT), and Management (BBMA). These programs are designed to equip students with the knowledge, skills, and competencies needed to integrate academic learning with real-world business practices over the course of their four-year studies. In addition to its undergraduate offerings, SBS also provides postgraduate programs, including Ph.D. programs in Information Technology, Accounting, Economics, Finance, and Banking; Master of Philosophy (M.Phil.) in Information Technology, Economics, Finance, and Banking; Master of Business Administration (MBA), Executive MBA (EMBA) and Master's programs in Accounting and Economics.

In addition, the School of Business Studies is developing other comprehensive postgraduate programs, including CPA-combined MBA, Master in IT, and Ph.D. programs in Management, which will be rolled out soon. All the programs of SBS are designed to drive PNGUoT's strategic visions and the government's development efforts, as well as push for regional and global competitiveness, innovation, and entrepreneurship in an increasingly complex business environment.

The school is also developing new postgraduate programs such as a CPA-integrated MBA, Master in IT, and a Ph.D. in Management, which are expected to launch soon. All programs are aligned with PNGUoT's strategic vision, the government's development goals, and the broader aim of fostering regional and global competitiveness, innovation, and entrepreneurship in an increasingly complex business environment.

SBS consists of both national and international academics who are dedicated, motivated, and committed to maintaining high-quality academic standards. The school emphasizes continuous innovation and the integration of digital technology into teaching and learning, supported by active industry engagement and participation in professional associations. Research is central to SBS's mission and serves as the foundation for producing high-quality graduates. This focus has helped foster a competitive research environment that meets both national and international standards.

The SBS currently has the Research Centre of Big Data Analytics and Intelligent Systems (BAIS) (founded in 2015) and the Centre of Innovation and Entrepreneurship (CIE) (founded in 2019). These centers provide the platform for research collaboration among national and international colleagues in the field of big data, big data analytics, Artificial Intelligence, business intelligence, intelligent systems, innovation, and entrepreneurship. BAIS circulated the ITCS-BAIS Vol 8, Issues 9-4 to its members and beyond to share the state- of-the-art big data analytics, data science, AI, and intelligent systems in 2024. BAIS has its presence at ResearchGate. In 2024, BAIS published 8 Preprints on big data, AI, big data analytics, business intelligence, and intelligent systems at https://www.researchgate.net/lab/Centre-of-Big-Data-Analytics-and-Intelligent-Systems-BAIS-Zhaohao-Sun a few of which have been indexed by Google Scholar. BAIS has drawn increasing attention in international academia.

The SBS's commitment to our students is evident in providing excellent learning opportunities aided by state-of-the-art ICT technology and support infrastructure. The SBS strives for excellence in teaching/learning, research, consultancy, and services to the community combined with innovation and interaction technological expertise necessary for progress. Our faculty is fully committed and engages in research and development, focusing on understanding the dynamics and innovations that shape the volatile business environment.

The SBS collaborates closely with many overseas universities, including University of New South Wales, Federation University, Charles Sturt University, and James Cook University of Australia, Handong University of Korea, and Hebei University of Science and Technology of China.

Research across the four main disciplines of the Department of Business Studies (DBS)—Economics, Management, Information Technology, and Accounting—is strongly encouraged. During the 2024 academic year, academic staff in the School of Business Studies (SBS) actively engaged in a range of research activities. The report shows a general increase in the number of peer-reviewed publications, which include journal articles, books, book chapters, conference papers, and preprints. Many of these have been indexed in major academic databases such as SCOPUS, ERA, ISI (SCI), and Google Scholar.

Despite this progress, stimulating, reactivating, and sustaining research passion and curiosity among academic staff—while increasing the output of high-quality, indexed research—remains a significant and ongoing challenge for SBS. Academic research performance is not only vital for enhancing the university's teaching capacity but also serves as a critical benchmark for national and international accreditation of both undergraduate and postgraduate programs.

Research at SBS

This section outlines the priority research areas for the School of Business Studies (SBS), along with current ongoing research projects and the individual research interests of academic staff in the Department of Business Studies (DBS).

Priority Areas of Research For SBS

The following are potential priority research areas identified by SBS:

1. Agricultural economics.
2. Artificial Intelligence and Data Science.
3. Big data analytics and artificial intelligence.
4. Economics and Financing of the Agro- based industries.
5. Digital citizen development.
6. Cloud computing & cybersecurity.
7. Economic development (income inequality and poverty) in Papua New Guinea.
8. Green marketing and Green HRM.
9. Higher education KPIs, strategic planning and funding.
10. Human capital and national development, marketing management.
11. Leadership management.
12. Small and Medium-Sized Businesses in Papua New Guinea.
13. Women entrepreneurship.

Current Ongoing Research Projects

SBS academic staff members as investigators have undertaken the following research projects in 2024.

Investigator	Project titles
Dr Adimuthu, R.	*A Study on Quality of Work-Life (QWL) And Its Influence on Job Satisfaction, Organizational Commitment and Overall Organizational Performance in the Premier Universities In PNG* *A Study on the Factorial Influence on Sustainable Small Business Enterprises (SMEs) Practices in PNG*
Dr Alamil, L.	*Strategic Implementation Management of SMEs*
Mr. Bomoteng, B.	*Financing in Tertiary Education in PNG*
	Managerial Accounting for Socio-Economic Development in PNG
Prof Dasanayaka, S.	*Micro, Small and Medium-Sized Businesses in Papua New Guinea*

Gipe, G.	*Key Measures and Trends in Economic Development in Papua New Guinea*
	Key Opportunities, Challengers and Enablers for Economic Development in PNG
Mr. Kuusa, M.	*The Impact of Tax Evasion on Revenue Collection in PNG*
Mr. Naro, R.	*Digitisation of PNG's Informal Economy: Table Markets and SMEs*
	Preservation of Cultural Inheritance Through Digital Rights Management (DRM): Distributed Ledger Technology (DTL) Smart Contracts
	Feasibility Analysis of Policy Draft Via Datafication: PNG Context (Public Sector)
Ms. Pambel, F.	*Big Data Driven Cybersecurity for Securing Citizen and Society in PNG*
Prof. B. K. Surya Prakasha Rao	*Securities Markets and Pricing, Insurance Industry, Banking Sector and Mutual Fund Industry*
Prof. Sun, Z	*AI-Driven Social Development In PNG*
Dr. Viswanadham N.	*Tax Policy and Incentives Towards Rural SME Business a Critical Study*
	Impact of Management Accounting Practices in the Manufacturing Industry in PNG: A Survey Study
Dr. Viswanadham N. & Mr. Kusa, M.	*Root Cause Analysis of Rural Entrepreneurial Finance Policy Failures*

These ongoing research projects are expected to lead into corresponding research outputs for SBS in 2025.

Research Interests of SBS Staff

The following table lists the current research interests of SBS Staff.

Academic Staff	Research Interests
Ms Abraham, Lulu Bokutoai	Education and Labour Economics, Fiscal Policy, Governance, Development Economics
Dr Adimuthu, Ramasamy	Human Resource Development and Organisational Behaviour Management, Leadership Management, Management of SMEs and Change Management
Dr Alamil, L.	Service Delivery Management of Local Level Government, Small and Medium Enterprises (SME) implementation, Eastern Highlands Province of PNG
Mr. Ambelye, John A.	Supply Chain Challenges of Fresh Food Marketing, Manufacturing in PNG - Supply Chain Challenges, Labor Productivity of Factory Workers in Lae, Billboard Advertising in PNG: Effectiveness and Challenges
Mr. Bomoteng, Bapa	Higher Education Financing and Management, Strategic Planning
Mr. Gipe, Gomi J	Economic Development in PNG, Development Economics, GDP and National Public Expenditure and their Impacts on Poverty in PNG, Income and Expenditure and their Impacts on Weight, Height and Body Mass Index (BMI)
Mr. Kale, Kaupa	Development Economics of Land Scarcity, Eviction and Urban Development, Sustainable Development Strategies in High- Yielding Agriculture

Mr. Konafo, Ken	Small and Medium Enterprises, Online Marketing, Fresh Produce Marketing
Mr. Kuusa, Matthew	Impact of Tax Evasion, Revenue Collection Performance in PNG, PNG SME Sector
Mr. Naro, Rodney	Cybersecurity, Artificial Intelligence, Cloud Computing, network engineering and management.
Ms Pambel, Francisca	Big data driven cybersecurity.
Mr. Pinjik, Paul	Organisational ICT Security Policy, Cybersecurity
Dr. Prabhakar, Akhilesh Chandra	Sustainable and Inclusive Economic Development, Regional Economic Cooperation (Investment, Trade and Technology), Agricultural and Rural Development, Social Entrepreneurship Development, Macroeconomic Policy and Economic Development Related Issues and Challenges
Prof. B. K. Surya Prakasha Rao	Securities Markets and Pricing, Insurance Industry, Banking Sector and Mutual Fund Industry, Financial Inclusion and Sustainable Development, Entrepreneurship Development, Taxing and Tax Research, Gender Discrimination and Socio Economic Effects in PNG
Prof. Sun, Zhaohao	Business Analytics and Big Data Analytics, Cybersecurity, Data Science, Artificial Intelligence, Cloud Computing
Mr. Tiki, Samson	Forensic Accounting and Investigation, Anti-money Laundering and Regulation, Financial Inclusion and Sustainability, Financial Forensic and Business Intelligence
Dr. Viswanadham, Nadiminti	Management Accounting, IFRS implementation, Environmental Accounting

Research Publications of SBS

In 2024, the SBS published 1 book and, 24 peer-reviewed (refereed) journal articles, 5 peer-reviewed international conference proceedings papers, 2 book chapter, and 2 preprints. The publications of SBS are classified as journal articles, books and book chapters, conference papers, and preprints.

Journal Articles Published

Alamil, L. (2024). Addressing business status, challenges and concerns: Perceptions of business growth and sustainability by SMEs based in Eastern Highlands Province, Papua New Guinea. *Interdisciplinary Journal of Papua New Guinea University of Technology*, *1*(2), 190–210.

Bolla, S., & Babu, H. B. (2024). Financial performance of Standard Chartered Bank and Kotak Mahindra Bank through CAMEL model: A comparative study. *Interdisciplinary Journal of Papua New Guinea University of Technology*, *1*(2), 167–173.

Dasanayaka, S., & Priyadhashini, S. (2024). Impact of emerging technologies on the export performance of the textile and apparel industry in Sri Lanka. *Journal of Technology and Value Addition*, *6*(2), 1–18.

Dasanayaka, S., Priyadhashini, R., & Abraham, B. (2024). Determinants of export performance of coconut industry in Sri Lanka with special reference to the export competitiveness. *Interdisciplinary Journal of Papua New Guinea University of Technology*, *1*(2), 119–137.

Dasanayaka, S., Wijewardhana, N., & Abraham, B. (2024). Identification of factors affecting the overrun of costs in rural road projects: A study based on Sri Lanka. *Interdisciplinary Journal of Papua New Guinea University of Technology*, *1*(1), 89–106.

Nadiminti, V., Tom, B., & Timana, E. (2024). The role of tax administration in shaping SME performance in Lae, Papua New Guinea. *International Journal of Finance & Banking Studies*, *13*(2), 40–50. https://doi.org/10.20525/ijfbs.v13i2.3567

Nadiminti, V., & Nerius, E. (2024). Systematic review of environmental accounting. *Interdisciplinary Journal of Papua New Guinea University of Technology*, *1*(1), 107–118.

Nadiminti, V., Bomoteng, B., & Sent, J. (2024). Are the university accounts sections using standard format and procedures in managing the financial resources and techniques in reporting? *Educational Administration: Theory and Practice*, *30*(6), 156–169.

Nadiminti, V., Kuusa, M., & Moses, E. (2024). Role of debt financing on SMEs' financial performance in Papua New Guinea. *International Journal of Trade, Economics and Finance*, *15*(2), 57–60.

Prabhakar, A. C. (2024). Shaping the global future: The strategic influence of the emerging Global South in the new international order (2022). *Journal of International Cooperation and Development*, *7*(3), 54–65. https://doi.org/10.36941/jicd-2024-0013

Prabhakar, A. C., & Brar, G. P. (2024). Green revolution, agricultural performance with sustainability and biodiversity: Special reference to India. *International Journal of Economic Performance*, *7*(1), 281–318.

Prabhakar, A. (2024). India and ASEAN: Visions and perspectives. *Journal of Indian Ocean Studies*, *31*(2), 223–239.

Prabhakar, A. C. (2024). Analysing the impact of China's Belt and Road Initiative on South Pacific countries' pursuit of self-reliance and sustainable development. *Journal of International Cooperation and Development*, *7*(2), 117–144.

Prabhakar, A. C. (2024). Charting paths to Pacific integration: A comparative study of FIPIC and CPIDF strategies for sustainable, inclusive, and self-reliant development in Papua New Guinea. *The Review of Socio-Economic Perspective*, *9*(1), 79–90.

Prabhakar, A. C. (2024). Driving economic prosperity: Fostering job-oriented sustainable and inclusive development in India. *Open Journal of Business and Management*, *12*(4), 2854–2884.

Prabhakar, A. C. (2024). Economic and business pathways towards sustainability: A comprehensive exploration. *Journal of International Cooperation and Development*, *7*(2), 23–48.

Prabhakar, A. C. (2024). India's manufacturing sector performance and job-oriented sustainable economic growth: A comprehensive analysis. *International Journal of Academic Research in Business & Social Sciences*, *14*(4), 1287–1306.

Prabhakar, A. C. (2024). India's industrial revolution: Navigating job-oriented growth amidst global geopolitical realities. *Mediterranean Journal of Social Sciences*, *15*(5), 33–45.

Prabhakar, A. C. (2024). Colonial echoes: Unraveling economic legacies and geopolitical shifts in the South Pacific Islands. *African and Asian Studies*, 1–29. https://doi.org/10.1163/15692108-bja10032

Prabhakar, A. C., Rodney, P., & Ambelye, J. (2024). Poverty in a richly endowed basin: A case study of Papua New Guinea. *Journal of Social Protection Research*, *5*(1), 5–23.

Ramasamy, A. (2024). Enhancing productivity and sustainable organisational performance of SMEs in emerging economies through digitalization of operational practices: Challenges and opportunities. *Advanced Engineering Science*, *56*(2), 1–13.

Rao, B. K. S. P., & Babu, H. B. (2024). Impact of GDP on Indian financial services sector: A study of the NIFTY financial stocks. *Applied Management Perspectives*, *3*(2), 82–87.

Sun, Z. (2024). Big Data 4.0: The era of big intelligence. *Journal of Computer Science Research*, *6*(1), 1–15.

Sun, Z., Wei, X., & Pambel, F. (2024). Developments of computing in Papua New Guinea in the post-independence era. *Journal of Computer and Communications*, *12*(8), 141–160.

Book Chapters

Embia, G., Ramasamy, A., Ray, M., Muduli, K., & Biswal, D. K. (2024). An examination of the impact of green marketing strategies on consumer attitudes towards environmental sustainability. In B. R. Moharana, B. C. Behera, & K. Muduli (Eds.), *Digital technology enabled circular economy* (pp. 145–167). CRC Press.

Books

Sun, Z. (2024). *Data analytics for business intelligence: A multi-industry approach*. CRC Press.

Viswandham, N., Kuusa, M., & Bomoteng, B. (2025). *The PNG SME sector*. Astitva Prakashan.

Conference Papers and Presentations

Dasanayaka, S., & Rex, J. (2024, July 1–4). Micro, small and medium-sized businesses in Papua New Guinea: Potential research pathways with a focus on technology-related issues. *7th PNG Science and Technology Conference*, Papua New Guinea University of Technology, Lae, Papua New Guinea.

Dasanayaka, S., Priyadhashini, S., & Yamarak, L. (2024, July 1–4). Impact of emerging technologies on the apparel industry in Sri Lanka. *7th PNG Science and Technology Conference*, Papua New Guinea University of Technology, Lae, Papua New Guinea.

Nadiminti, V., & Wojem, R. (2024). Do economic reforms have any impact on the growth of foreign direct investment inflows in Papua New Guinea? *Management Education and Research Colloquium (MERC)*, Indian Institute of Management, Kashipur, Uttarakhand, India.

Nadiminti, V., Kuusa, M., & Tom, B. (2024). How does the tax system and tax administration affect the making and operations of SMEs? *International Conference on 3Ps (People, Planet and Prosperity): Creating a Sustainable Global Business Model*.

Sun, Z. (2024, July 1–4). Human-centered artificial intelligence development. *7th PNG Science and Technology Conference*, Papua New Guinea University of Technology, Lae, Papua New Guinea.

Sun, Z. (2024, July 1–4). In quest of data, analytics and intelligence. *7th PNG Science and Technology Conference*, Papua New Guinea University of Technology, Lae, Papua New Guinea.

Sun, Z. (2024). Data, analytics, and intelligence: A unified approach. In *Proceedings of the 2024 7th International Conference on Software Engineering and Information Management (ICSIM '24)* (pp. 62–70). Association for Computing Machinery. https://doi.org/10.1145/3647722.3647732

Sun, Z. (2024). Big data 4.0 = Meta4 (Big Data) = The era of big intelligence. In *Proceedings of the 2024 7th International Conference on Software Engineering and Information Management (ICSIM '24)* (pp. 14–22). Association for Computing Machinery. https://doi.org/10.1145/3647722.3647725

Working Papers (Preprints)

Sun, Z. (2024, April). *Business intelligence and decision support 2024* [Preprint]. https://doi.org/10.13140/RG.2.2.11865.33126

Sun, Z. (2024, April 30). *Web computing and eSMACS computing 2024* [Preprint]. ResearchGate. https://www.researchgate.net/publication/380184887

Invited Presentations

Surya Prakasha Rao, B. K. (2024, December 6). Cost benefit analysis of Industry 4.0 investments. Presentation at the One Week ATAL Online Faculty Development Programme on *Manufacturing Innovation and*

Organizational Excellence, Department of Business Administration, P.B. Siddhartha College of Arts and Science.

Surya Prakasha Rao, B. K. (2024, November 27–December 10). Global financial crises: From cracking depression to corking recession. Presentation at the Interdisciplinary Refresher Course on Economics, Commerce and Business Management, UGC-MMTTC, Mizoram University, Aizawl, India.

Research Grants Received

Sun, Z. Research Project entitled Big Data Analytics-Driven Socio-Economic Development in PNG (2022-2024), National Science and Technology Secretariat (PNG STS). PNG STS granted another K50,000.00 (November 2022 to support research in 2023) to PNGUoT.

Seminar Presentations at SBS

Speakers	**Topics**
Mr. Bapa Bomotong	*The Role of Key Performance Indicators in Higher Education Funding and Strategic Planning*
Dr. Viswa Nadham Nadiminti	*The Importance of SME Sector for Economic Growth and Development in PNG: A Critical Review*
Dr. Luis R. Alamil	*Addressing business status, challenges and concerns of growth and sustainability of SMEs, a Study based on Eastern Highlands Province of Papua New Guinea*
Mr. Theo Michael	*New Innovative Financing Mechanisms for the Development of Export Agriculture in Papua New Guinea: A Case Study of Key Commodities*
Mr. Rex Junior	*Smallholder Coffee Farmers' Perception of Climate-Adapted Attributes in Participatory Coffee Breeding: A Case Study of Goroka District and Markham Valley, Papua New Guinea*

Postgraduate Student Research

Student	**Program**	**Research Title**	**Funding source**	**Supervisor**
Bapa Bomoteng	PhD	*Key Performance Indicators in Higher Education in Association with Funding and Strategic Planning*	PNGUOT (LNSDC)	Dr. Viswanadham Nadiminti
Peter Helebi	PhD (IT)	*Leveraging Socio- economic Development in PNG Through Big Data Analytics: A Data Science Approach*	Self-funded	Prof. Zhaohao Sun
Mike Yandit	Ph.D.	*Exploring the Challenges of Financial Inclusion and Management on SMEs in PNG.*	Self-funded	Dr Viswanadham Nadiminti

Desmond Narongou	M.Phil (IT)	*Big data Analytics-Driven Smart Airport Development in PNG*	PNG STS grant	Prof. Zhaohao Sun Ms Francisca Pambel
Mathis Piru	M.Phil-Accounting	*An Investigative study of tax policy and its Implications on PNG economy.*	Internal Revenue Commission, PNG	Dr. Viswanadham Nadiminti
Mr. Junior Rex	MPhil	*PNG Coffee Sector Environmental Sustainability Issues*	Self-funded	Prof. SWSB Dasanayaka
Mr. Boyeb Instructor	MPhil	*DFI and MNCs roles in PNG Economic Development*	Self-funded	Prof. SWSB Dasanayaka
Rex Jackson Hifu	M.Phil	*Digital Financial Services and Financial Inclusion in Papua New Guinea*	PNGUOT (LNSDC)	Prof. B. K. Surya Prakasha Rao

Undergraduate Projects

Final year UG research projects supervised by Prof. SWSB Dasanayaka for 2024 in Applied Economics Department.

1. Identification of Factors Affecting the Attraction of Foreign Direct Investment to Papua New Guinea and its Impact on Inclusive Economic Growth
2. Exploring the Impact of Inflation on Consumer Behavior in Papua New Guinea: A Case Study in Lae
3. An Examination of the Potential Economic Benefits and Risks of the Ramu Nickel Mining Project in Madang Province, Papua New Guinea
4. Assessing the Factors Affecting Coffee Production in PNG
5. Impact of Foreign Exchange Shortage on the Fuel Supply Stability in PNG: A Case Study Based on Puma Energy Limited
6. An Analysis of Foreign Exchange Reserve Dynamics in Papua New Guinea: Influencing Factors and Strategic Management Approaches
7. Relationship between Transportation Networks, Especially Trucking Services, and Economic Growth in Lae, Morobe Province and Western Highlands Province
8. Examining How OK Tedi Mining Limited Affects the Local Economy of North Fly District in Western Province
9. Identification of Factors Affecting the Development of Share Markets in PNG: A case Study Based on PNG Market Shares
10. Access the Quality of Health Service Delivery in University Health Clinics: A case Study of PNG University of Technology
11. Import Substitution Trade Strategy for Economic Growth and Development in Papua New Guinea
12. Assessing Exchange Rate Dynamics and the Impact of Central Bank Policies in Papua New Guinea: A Case Study on Exchange Rate Stability

13. Impact of Analysis of Chicken Farming in Kumdi, Western Highlands Province.
14. Oil Plam Industry in PNG
15. The Impact of Kina Devaluation on Inflation and Trade Balance in Papua New Guinea: A Multiple Regression Analysis
16. A Study Assessing the Impacts of Technological Investments on Employment Growth in Micro, Small and Medium Enterprise (MSMEs) in Papua New Guinea
17. Assessing the Economic Impacts of Climate Change on Small Holder Coffee Farming Communities in Goroka, Eastern Highlands Province
18. A Study of the Impacts of Forex Rates on Local SME Operations
19. The Drivers Behind Student Consumers' Preferences for Smartphone at Papua New Guinea University of Technology
20. Identification of Factors Affecting Formalization of the Informal Sector for Money Lenders in Papua New Guinea
21. Impact of Inflation on Production Costs of Leading Manufacturing Companies in Lae City, PNG
22. Impact of Taro Production and Marketing: A Study of Mamaringan Village, Markham District
23. The Negative Impact of Gold Mine in Pogera
24. A Study on Transforming the Export Agriculture by Improving Productivity, Efficiency, Competitiveness in Achieving Export Diversification for Economic Growth in Papua New Guinea
25. The Impact of International Trade Agreements on Shifting of Papua New Guinea's Export Trade Pattern Towards High Capital-Intensive Products.
26. Factor Affecting the Determinants of Real Interest Rates in Papua New Guinea
27. A Study on Transforming the Export Agriculture by Improving Productivity, Efficiency, Competitiveness in Achieving Export Diversification for Economic Growth in Papua New Guinea
28. The Impact of International Trade Agreements on Shifting of Papua New Guinea's Export Trade Pattern Towards High Capital-Intensive Products
29. Factor Affecting the Determinants of Real Interest Rates in Papua New Guinea
30. Identification of Factors Affecting Development of Entrepreneurial Traits in Morobe Province
31. Analyzing the Economic Factors Influencing the Secondary Dropouts in Papua New Guinea: A case study based on secondary schools in Lae City
32. Impacts of Industrial Training (IT) on Reducing Unemployment Among the University Graduates in PNG: A Study Based on Final Year Business Students in UNITECH
33. A Study on Transforming the Export Agriculture by Improving Productivity, Efficiency, Competitiveness in Achieving Export Diversification for Economic Growth in Papua New Guinea
34. The Impact of International Trade Agreements on Shifting of Papua New Guinea's Export Trade Pattern Towards High Capital-Intensive Products
35. Factor Affecting the Determinants of Real Interest Rates in Papua New Guinea
36. Identification of Factors Affecting Development of Entrepreneurial Traits in Morobe Province
37. Analysing the Economic Factors Influencing the Secondary Dropouts in Papua New Guinea: A case study based on secondary schools in Lae City
38. Exploring the Impact of Inflation on Consumer Behavior in Papua New Guinea: A Case Study in Lae

National and International Outreach

- Prof Sun, Z. collaborated with Professor Andrew Stranieri of Federation University Australia and Prof Kenneth Strang of USA and developed a few research papers on intelligent analytics and AI in 2024
- Prof Sun, Z. has been working on the Editorial Board of following International Journals:

Editors-in-Chief of Interdisciplinary Journal of Papua New Guinea University of Technology
Editor of Journal of New Mathematics and Natural Computation (http://www.worldscientific.com/worldscinet/nmnc) (SCOPUS, WoS indexed)
Editorial Review Board of Journal of Computer Information Systems (SCOPUS, WoS/SCI indexed)
Associate Editor of Journal of Intelligent and Fuzzy Systems (SCOPUS, WoS indexed)

Associate Editor of International Journal of Systems and Service-Oriented Engineering (IJSSOE). (DBLP, ACM indexed)
Associate Editor of International Journal of Business Intelligence Research (http://www.igi-global.com/journal/international-journal-business-intelligence- research/1168).
Associate Editor of International Journal of Risk and Contingency Management (IJRCM).
Member of organizing committee of international conference ICAART 2024
Reviewed a number of papers for each of other journals.

- Prof. B. K. Surya Prakasha Rao serves as a peer reviewer for numerous international, indexed journals and is also a member of the editorial boards of several international academic journals.

Memberships of Professional Associations

Prof. B. K. Surya Prakasha Rao is a member of the following professional bodies, contributed his expertise to several universities in Sri Lanka, India, and Pakistan by offering honorary services as a PhD/Master's thesis examiner, conference resource person, examination paper moderator, and professor application evaluator:

- Indian Commerce Association (ICA), India- Life Member
- Indian Council for Business Education (ICBA), India- Life Member
- Accounting and Finance Association of Australia and New Zealand (AFAANZ)- Annual member
- American Economic Association (USA)
- Chartered Institute of Transport and Logistics (UK)
- Chartered Institute of Highways and Transport (UK)
- Network of Asia Pacific Schools and Institutes of Public Administration and Governance (NAPSIPAG), Malaysia
- International Association for Research in Income and Wealth (IARIW), Canada
- International Association of Maritime Economists, Canada
- Sri Lanka Association of Economists, and
- Sri Lanka Association for the Advancement of Science (SLAAS), Colombo

Prof Sun, Z. is a senior member of

- Australia Computer Society (ACS), Australia,
- Institute of Electrical and Electronics Engineers (IEEE),
- A distinguished member of Association for Information Systems (AIS)
- Association for Computing Machinery (ACM)

Dr. Viswanadham Nadiminti is a member of

- Indian Finance Association- Life member,
- Accounting and Finance Association of Australia and New Zealand-Member

SCHOOL OF COMMUNICATION AND DEVELOPMENT STUDIES

Head of School: Dr Rachel Aisoli-Orake

As concerns *teaching activities*, the School of Communication and Development Studies (SCDS) offers a 4-year professional program that has two sections: An optional service-course sequence in English for Academic Purposes (EAP) for students across all disciplines of the University, and a professional Communication for Development (C4D) degree program designed to train liaison and community development and public relations officers for resource development companies, government departments, and non-government organizations. It also presently administers the Postgraduate Certificate Course in Student-Centered Teaching for the further specialized training of academic staff at the Papua New Guinea University of Technology (PNGUoT) with the University's Teaching and Learning Unit (TLMU), as well as a soft-skills lunchtime lecture program for both undergraduates and postgraduate students, sponsored by a nascent Academic Resource Center (ARC).

In 2009, the school began offering a Masters in Communication Studies (MCS) program. This program has both a coursework and a dissertation component, where the students write a research paper on an appropriate topic in their final semester of the second year. In addition, a Masters of Arts in Organizational Leadership is periodically offered in cooperation with Development Associates International (DAI), The Christian Leadership Training College of Papua New Guinea (CLTC), and the Pioneers of Australia. Now this is in suspension because of funding issues, currently undergoing revisioning with an eye to make its sustainable.

As concerns *research activities*, the SCDS blends three broad academic strands (EAP/Communication Studies, Sociology, and Communication for Development). Through its individual members of staff, research is conducted under general umbrellas (Linguistics and Culture, EAP, English for Special Purposes (ESP), Sociology, and Communication for Development).

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

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

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

Both empirical (quantitative or qualitative) approaches to relevant topics are employed by our academics, with trans-disciplinary innovations (such as action research) encouraged. The School publishes an international peer-reviewed organ, the *JCDS: Journal of Communication and Development Studies* under the editorship of Professor Gilder, in cooperation with the UNESCO Chair of Quality Management of Higher Education and Lifelong Learning of "Lucian Blaga" University of Sibiu, Romania, and its Director, Prof *habil*. Dr Silvia Florea. The next issue will be published in 2025.

Research Interests of the Faculty Members

Name	Position	Research Interests
Prof Dr *habil*. Eric Gilder	Professor, Editor-in-Chief, *JCDS*	Higher Education Policy, Scientific Communication, Technology and Society, Communication Theory and Practices Across Intercultural Contexts, Radio-TV History

		and Legal Aspects of Broadcasting and the Socio-Psychological Aspects of the Communication Process
Dr Madan Mohan Laddunuri	Professor	Sociological Theory, Education, Community Development, Public Administration and Management, Pacific Island Studies, Organizational Change, Tourism Management, Health Demographics
Dr Rachel Aisoli-Orake	HoS, Senior Lecturer	English as a Second Language Writing, Education/English Curriculum and Pedagogy, English for Academic Purposes, Cross-Cultural Communication, Development and Responsibility, Participatory Research
Michael Winuan	D/HoS, Lecturer II	English for Academic Purposes, Farming and Community/National Development
George Wrondimi	Lecturer II	Social Work; Social Policy and Planning; Social Mapping; Community Development
Imelda Ambelye	Lecturer I	Education and Community Empowerment (Women and Youth), Natural Resources (Mining and Other Extractive Industries) in PNG
Joshua Frank Kuri	Lecturer I	Language Development and Practices via Bilingual Education; Practices and Effects of Communication across Developing Societies, Disaster and Risk Management, Workplace Safety and Risk Management
Nagiob Jesse	Lecturer I	Engineering and Sustainable Development Practices, Research Methods and Skills, Workplace/Business Communication, Development Studies, Communication For Development, Socioeconomic Development Research, Strategic Planning, Implementation, Monitoring and Evaluation
Lucy Maino	Lecturer II	Participatory Development Communication (PDC) for Engaging Stakeholders (Individuals, Groups, and Institutions) in Socio-Economic Change Processes, Participatory Social Mapping for Community Development, Environment and Agricultural Innovation, English for Academic Purposes (EAP)
Sheryl S. Makara	Lecturer I	Emotional Intelligence and Leadership, Critical Thinking, Communication in Crime, Sociology in Relations to Development, Community Development and Participation
John Milba	Lecturer I	Sports as a Vital Tool in Behaviour Change of Young People in Communities: A Perspective of Rugby League, Development from a Perspective of Guided Strategy: A Perspective of a Developing Nation - Papua New Guinea; Urban Sociology in Consideration of Sustainable Development Goals
Ruth Moka	Lecturer I	English for Academic Purposes, Community Development, Secondary Education in PNG.
Wilma M. Langa	Lecturer I	Sociology of Children, Sociology of Deviance and Crime
Jeremiah Iko	Tutor (Part-Time)	Communication for Development
Mispher Nanu	Tutor (Part-Time)	Use of Triggering Tools with Effective Results for CLTS-Community led Total Sanitation Approach in PNG Societies;

		Assessing The Sustainability Impact Of CLTS-Community led Total Sanitation Approach in Nawaeb District: A Report Based Analysis
Starza Paul	Lecturer I	Journalism Theory and Practice; National Development
Jack Yaro	Lecturer I	Development, Work and Safety Training
Ian Yengki	Lecturer I	Sustainable Practices in Development.

Ongoing Community Partnership Projects

Starza Paul engaged as a research partner with Canberra University and ACIAR on a 'Sago & Food Security,' project in Western Province, an ongoing project. He also carried out research with other researchers from PNGUoT on arms smuggling & tribal warfare in Enga and the Highlands, an ongoing project funded by PNGUoT. He completed a research project on crime and safety in Morobe in collaboration with Australia National University.

Joshua Kuri, George Wrondimi, and **Jack Yaro** led PNGUoT & RAIL in an on-site OHSRM Training. Under an MoU, The Papua New Guinea University of Technology (PNGUoT) and the Ramu Agri-Industries Limited (RAIL) had for the first time witnessed a positive breakthrough in bringing Occupational Health, Safety and Risk Management Training (OHRSM) to the Industry's doorsteps. SCDS Staff taught the 14-day intensive training at the Ramu Sugar Industry site, concluding on 9 December with the awarding of certificates to the participants.

Dr Rachel Aisoli-Orake, John Milba, Joel Sefo, and Imelda Ambelye participated in a CDSSA Industrial Talk Program with the theme: "To Inspire aspirations by sharing experiences from different fields of C4D" on 27 July.

Dr Rachel Aisoli-Orake, John Milba, and Mr Ian Yengki and six BACD/3 students participated in a collaborated study by the School of Communication and Development Studies (SCDS) at Papua New Guinea University of Technology, National Agriculture Research Institute, Papua New Guinea University of Goroka and National Forest Authority. It was funded by the Australian Centre for International Agricultural Research (ACIAR). The project site was at Patep village in the Bulolo District of Morobe Province.

This ACIAR project, "Climate Smart Agriculture" opportunities for enhanced food production in Papua New Guinea, focused at the Patep indigenous irrigation practices was part of the project's objective on assessing the value of scientific and indigenous knowledge to improve food production in rural communities. The activities included interview surveys, mapping the GPS waypoints of interests, and interviewing 2 elders for a short film by the CSCM. The BACD/3 students observed how community filming was done. Mr Yengki of the SCDS team compiled a Community Profile for Patep Village.

In concert with **Professor Dr. *habil.* Silva Florea of LBUS, Professor Eric Gilder** taught in the online CIDASE Master's program in Sino-European Intercultural and Business Communication, which is done under the organizational umbrella of the Confucius Institute there. He also serves as SCDS Academic Program Benchmarking Coordinator, in cooperation with Professor Florea.

POSTGRADUATE CERTIFICATE IN STUDENT-CENTERED TEACHING (PCSCT) 2024

Taught at the TLMU Center under the supervision of Prof Eric Gilder, the PCSCT consisted of the following modules, offered to nominated academic staff members at the University an expanded one-year pedagogical program meeting NQF Level 8: CD 511: LMS and Flipped Classroom; CD 512: Project/Problem-Based Learning,

CD 513: International Trends in Higher Education Teaching and Learning, and CD: 514 Capstone Project. Four enrollees completed all subject requirements for the course, and will thus obtain a PG Certificate in April 2025:

1. Benjamin Magip
2. John Milba
3. Bikash Maharana
4. Alak Kumar Patra
5. Spencer Poloma
6. Sailesh Samantha
7. Albert Ude
8. Alex Wemin
9. Mathew Waimbo
10. Camilla Kwaudi Yanabis

Postgraduate Research Supervision/Examining

Prof Eric Gilder served as external commission member to the following students from Lucian Blaga" University of Sibiu (Romania).

PhD Candidate	Research Title
Scott Eastman (Year VI)	*Standardized Methodology for Implementing Applied Critical Geopolitical Discourse Analysis to Improve Forecast Accuracy*
Matei Budai Daniela	*An Overview of Critical Discourse Analysis: Theory and Method*

Candidate	Program/Year	Supervisor(s)	Research Topic
Lucy MAINO	PhD/2	Dr. Bue (Agriculture)/ Prof. Gilder	*Impacts of Integrated Development Approaches on the Livelihood of Rural People: A Case Study in the Oro Province of Papua New Guinea*
Linneth A. Mane	MCS/3	Dr. Aisoli-Orake/ Ms Ambelye	*The Challenges in Teaching English as a Second Language in Papua New Guinea (PNG): A Case study of Upper Secondary Schools Teachers in the National Capital District (NCD)*
Elias Moka	MCS/2	Ms. Ambelye/ Dr. Aisoli-Orake	*Communication Strategies for Entrepreneurial Self-Reliance Projects in Papua New Guinea Educational Institutions: A Case Study for Educational Institutions in Lae, Morobe Province*
Tania Peter	MCS/3	Prof. Gilder/ Dr. Aisoli-Orake	*Assessing the Key Required Competencies of Public Relations Communication Practitioners in PNG Today: A Survey of PR Professionals Employed by UN-Accredited NGO's in Port Moresby*
Charles Alikang	MCS/2	Prof. Gilder/ Ms. Ambelye	*Communication Strategies on Ploy Techniques Used by Asians to Succeed in Business in the Country: A Case Study of Success of Asian Businesses in Maprik District, East Sepik Province*
Lonia Bandi	MCS/2	Dr. Aisoli-Orake/ Ms. Ambelye	*Assertive Parenting for a Better and Quality Education - A Case Study of Parents in*

			Selected Primary & Secondary Schools in PNG.
Joanne Yandimowal	MCS/2	Ms. Ambelye/ Prof. Gilder	*Strategic Communication for developing the Informal Economy Sector of the economy 2023: A Research on Impact of Media Strategies to Usage of Public Goods and Services by the Vendors of Urban and Rural Markets.*
Samuel Toully Gunua	MCS/1	Prof. Madan	*Fraud Claims and Their Effects on the PNG Motor Vehicle Insurance Industry: A Case Study on the Compulsory Third Party Insurance Requirement*
Izzabellah F. Homingu	MCS/1	Prof. Gilder / Dr. Aisoli-Orake	*Developing Strategies for Effective Communication and Mentoring to Improve Postgraduate Students Retention and Completion Rates: A Case Study at the PNG University of Technology*
Steve Langa	MCS/1	Prof. Madan / Prof. Gilder	*Analysis of Factors Contributing to the Delay of Major Road Construction Projects in Lae: A Case Study of the Yalu Bridge – Nadzap Four Lane Road Construction in Lae, Morobe Province*
Belinda Wambi	MCS/1	Dr. Aisoli-Orake / Prof. Madan	*Investigating the Cause of Poor Performance of Grade 12 Students in the National Examinations: A Case Study of Teachers and Students in the Eight Secondary Schools of Southern Highlands Province*
Tabitha Wosse	MCS/1	Prof. Gilder / Ms. Ambelye	*A Comparative Analysis on Public Relations Strategies in PNG Universities: A Case Study of Public and Private Universities*
Priscilla Menin	MPhil/2 (Forestry)	Dr Moses/Dr Aisoli-Orake	*Assessing the Socio-economic impact of forestry pine plantations on local communities: A case study of the Manki clan of Papua New Guinea*

Undergraduate Research Project

CD 423: Dissertation – Communication & Development

Name	Topic	Supervisor
Priscilla Balana	*Exploring the Role of social media in Promoting Mental Health Awareness among Student at The Papua New Guinea University Technology.*	Prof. Gilder
Teshildah Beiyo	*A Qualitative Assessment on the Social Impacts of Inadequate existing HIV/AIDS Support System: A Case study on HIV-Impacted children in Port Moresby.*	Mrs. Moka
Jacob Bodger	*Exploring Community Perceptions: A Study on Understanding Bilimoia's Perception on K92 Mine.*	Mrs. Makara

Elizah Timbi Blake	*Students' Perception on the Lack of Discipline and Conduct of Police in Lae, Morobe Province from a Communication and Development Perspective.*	Mr. Sefo
Shabod Elipas	*Crime and Development in East New Britain Province and Papua New Guinea, with Specific Reference to the Abuse and Usage of Marijuana Consumption: A Case study on the Youth of Ialakau Village in East New Britian Province.*	Mr. Wrondimi & Ms. Ambelye
Hannah Gialom	*Rundown Police Facilities Hindering Effective Service Delivery; A Case study of Bumbu Police Barracks, Lae.*	Mr. Paul
Pamela Haan	*The Effects of High Rate of Youth Unemployment in Urban Areas: A Case study for the Youths of East Taraka Labi Police Barracks, Lae Morobe Province of Papua New Guinea.*	Mrs. Makara
Glenda Holee	*Violence Against Women in PNG's Experience & Views.*	Ms. Ambelye
Amae Hubert	*Assessing Public Attitude Toward Littering: A Case Study for Lae, Top Town.*	Mrs. Langa
Wesley Indi	*Adequate Housing and Instability as a Precursor to Homelessness.*	Ms. Ambelye
Raymond James	*Comparative Analysis of the Teaching Methods used at the PNG University of Technology*	Mrs. Moka
Shelita Kaluvalu	*The Causes and Effect of Poor Education Administration: Case study of Bayune Lutheran Secondary in Bulolo District – Morobe Province, Papua New Guinea*	Mr. Jesse
Fay Kamano	*The Economic Contribution of the Central Cement and Limestone Project on Household Income and Expenditure: A Case study of Kido Village, Kairuku -Hiri District, Central Province*	Mr. Winuan
Ryan Karlo	*The Negative Impact of Informal Settlements on the Environment. A Case study of Nawae Block, Morobe Province*	Mr. Milba
Kerisha Karap	*The Impact of Inadequate Resourcing of Basic Public Services in Banz Kerowil Village, North Waghi, Jiwaka Province*	Mr. Yengki
Samantha Kera	*Factor Affecting the Success and Sustainability of Non-Governmental Funded Projects in Papua New Guinea: Case study of Lae Adventist Development & Relief Agency (NGO)*	Mr. Paul
Vurvavina Kiapini	*Effective Communication Strategies in Addressing Clean Water and Latrine Challenge faced by Rural Community Schools in Madang Schools: A Case study of Urimong Primary School in Sumkar District*	Mr. Yaro

Natasha Kima	*The Adverse Effects Alcohol has on Families – A Case Study of Alcohol Uses By Nuclear Families in the Liquor Banned Semi-Rural Areas of Bilimoia and Unanta in Kainantu Eastern Highlands Province.*	Mr. Kuri and Mr. Milba
Jane Komuna	*Assessment to Developing Comprehensive Strategies for Upgrading the Rainforest Habitat at The Papua New Guinea University of Technology*	Mr. Sefo
Nerius Lopie Kotiti	*A Study on the Declining Student Academic Performance: A Case of Public Secondary Schools, Talasea District, West New Britian Province*	Mr. Sefo
Gantaza Kuman	*Social Effects of Domestic Abuse on Children, A Case study of Ward 2 Seven Street, Lae City*	Prof. Gilder
Jemimah Kupal	*Effect of International Communication and Conflict Resolution in Community Development: A Case study of Sangkiang Community in Ramu Sugar, Usino Bundi District, Madang Province*	Mrs. Makara
Justina Kuri	*The Effects of Alcohol on the Academic Performance of the Communication for Development Studies Student at the PNG Unitech*	Mr. Wrondimi
Felicita A. Malipu	*Challenges Faced by The Involvement of Landowner Company to Support PNG LNG Project – Case Study of Landowner in PDL 7*	Mr. Milba
Kamakan Kapi Malipu	*Impacts of Underdevelopment on the Livelihood of Suburban Communities: A Case Study of Tent- Siti, Lae, Morobe Province*	Mr. Sefo and Mr. Jesse
Fa'a-Daniel Manue	*Social Accountability and Good Governance Practices Between Citizens and Governance Representatives in the Local Level Government: A Case study in Leigh Vial Street, Ward 3, Kama Housing Commission, Goroka, Eastern Highlands Province*	Mr. Sefo
Lydia Mariaki	*Bridging the Digital Divide in Secondary School of Lae City. A Case study of Bumayong Lutheran Secondary School, Lae Morobe Province*	Mr. Winuan
Jasmine Merimba	*The Impact of Excessive Social Media Usage on Tertiary Students' Academic Performance: An Empirical Case study of Communication & Development Studies of the PNG University of Technology, Lae, Morobe Province*	Mr. Milba
Anne- Marie Mesake	*Assessing the Hygiene and Sanitation Compliance in the Universities Residence: A Case study of the Main Female Residential Hall at the Papua New Guinea University of Technology*	Mr. Milba and Ms. Ambelye

Michael Molo	*The letter Grading System: Study on the Quality of Communication Students Learning Performance in Upper Primary for Urban Schools in Lae*	Ms. Ambelye
Phianna Morua	*E- Governance & Public Participation for Development in Lae PNG; A Case in Lae City*	Ms. Ambelye
Zebalyn Negeva	*Effective Teaching Strategies in Improving Adult Literacy Program: A Case study of K92 Mining Adult Literacy Program at Barinenka Learning Centre, Kainantu, Eastern Highlands Province*	Mr. Yaro
Renee Ofae	*Sustainability Assessment of Social Infrastructure Project and Asset Maintenance in Resources Development Impact Site: A Case study of the Four PPFL2 Villages, PNG LNG Project, Central Province*	Ms, Ambelye
Gene Ogan	*Impacts of Excessive Use of Social Media on Students' Academic Studies: A Case study of Final Year Undergraduates Student at the University of Technology, Taraka Campus*	Mr. Kuri
Terrence Pema	*Using Interpersonal Communication to Combat Youth Unemployment in Papua New Guinea*	Mr. Yengki
Fabian Row	*A Study on the Impact of Improved Water Supply on Male Participation in Water Collection in Nuknuk Village, Salamaua LLG, Huon Gulf District, Lae Morobe Province*	Mrs. Langa
Jamela Sataro	*Investing the Impact of Street Vending: A Case study of Mobile Marketing in Waigani, National Capital District, Papua New Guinea*	Mr. Milba
Bianca Senat	*Assessing the Negative Impact on Self- Sponsored Students and their Academic Performance Due to Exclusion of Boarding Privileges within Campus (A Case study in Papua New Guinea University of Technology)*	Ms. Ambelye
Philma Sengi	*Development Challenges Impending Health Service Improvement; A Case Study of Ineffective Health System in Kainantu District Hospital*	Mrs. Moka
Talitha Tali	*Impact of the Waste Disposal Site on its Surrounding Communities: A Case study of Second Seventh Dump Site, Lae Morobe Province*	Mr. Milba
Macdeline Taupin	*Communication Strategies in Addressing Law and Order in Lae City: A Case study of West Taraka Residents in Lullg, Huon Gulf District, Morobe Province*	Mr. Yaro
Yoshidah Tingnni	*Psychological Impacts of Police Officers- Lae, East Taraka*	Mr. Winuan
Daniel Tuckayo	*Analysing the Social- Economic and Psychological Effects of Youth Unemployment: A Case study of Labu Butu Community*	Prof. Madan Mohan

Israel Oswyn	*Equal Participation for Women in the Extractive/ Mining Industry*	Mr. Sefo
Grace Uyassi	*The Downside of Public Servant's Fixed Wages; Its Effect on Employee's Work Performance & Punctuality*	Ms. Ambelye
Esther Vanoh	*Drainage Rehabilitation: Assessment of Social and Environmental Impact on Current Drainage System in Lae Urban: Case study on Bugandi Community*	Ms. Ambelye
Junior Wafi	*Assessing types of Crime that Determined in an Urban Community: A Case study of Papuan Compound, Lae Morobe Province*	Mr. Wrondimi and Ms. Ambelye
Patricia Wanariu	*Assessing the Impact of Crime on Social-Economic Development in a community: A Case study of Mis Village*	Mr. Sefo
Tyron Warin	*A Comprehensive Analysis of Genoka Settlement Expansion and the Unemployment Rate of Young Adults within Genoka Settlement*	Mr. Kuri
Beatrice William	*Social- Economic Factors Influencing Crime in Society of Papua New Guinea: A Case study of Sisiak 3 Madang Province*	Mr. Paul
Talu Wini	*Assessment of the Female Participation in the Extractive Industries in Reference to PNG NGDP 2: Equality and Participation*	Prof. Madan
Florin Yapo	*Assessing the Impact of Gender Base Violence (GBV) in Lae City in Association with Sustainable Development Goal Five (SDG 5); Gender Equity*	Ms. Ambelye
Faustina Yapog	*Lack of Adequate Infrastructure and Resource Effects on The Quality Education and Students' Academic Performances: A Case study of Public Schools in the Eriku Suburb of Lae City, Morobe Province*	Mrs. Makara
Graham Yimbang	*Assessing the role of Public Relations and its impact on the growth of organisation in Papua New Guinea: An empirical case study of the PNG University of Technology*	Mrs. Langa

Journal Articles Published

Sali, G. (2024). Unravelling the Threats of Violence: An Analysis of the 2022 National General Election Violence in Papua New Guinea. *Romanian Review of Political Sciences and International Relations, 21*(1), 67-94. https://2c2e45e5-12d6-4ee7-81f3-41c6c611007c.filesusr.com/ugd/1c5576_4dd7c56053604e86be25c7b9d77b1770.pdf

Ssemugenyi, F., & Sali, G. (2024). Is There a Best Way to Teach? Evaluating the Traditional and E-Learning Pedagogies from the Promise and Perils Perspectives. *Creative Education, 15,* 1359-1376. https://www.scirp.org/journal/paperinformation?paperid=134522

Yaro, J., & Sali, G. (2024). Effective Communication for Enhancing Occupational Health, Safety, and Risk Management in the Mining Industries in Papua New Guinea: A Case Study of Porgera Gold Mining in the Enga Province. *South Pacific Studies, 44*(1-2), 33-56. http://cpi.kagoshima-u.ac.jp/publications/southpacificstudies/sps/sps44-12/SouthPacificStudies44-12-pp33-56.pdf

Yamarak, L., Paul, S., & Junior, R. (2024). Socioeconomic Impact Assessment of Dunantina- Dumpu Road Project: Henganofi to Ramu Road Connection between Heganofi & Ramu Districts in Papua New Guinea. *International Journal of Modern & Research Technology*, *2* (11), 1-19. http://dx.doi.org/10.5281/zenodo.14059972

Scholarly Presentations

Langa, W. (2024, August 21–22). *Hybridity and safety in an urban economic environment: Experiences from Awagasi Market vendors*. University of Papua New Guinea, Port Moresby.

Langa, W. (2024, July 11–22). *Mediation and market governance: Experiences from market women vendors in Papua New Guinea*. University of Melbourne, Australia.

Wrondimi, G. (2024, February 5). *The CDS Department Staff Micro Credit Fund: A self-sponsored welfare fund for staff members of the Department of Communication and Development Studies, at the Papua New Guinea University of Technology (PNGUoT), Lae, Morobe Province*. SCDS, Papua New Guinea University of Technology.

Project Report

Yengki, I., Sar, L., Sar, S., Aisoli-Orake, R., Milba, J., Topasona, S., & Sam, N. (2024). *Community Profile Baseline Information for Patep Village: Ward 6 of Mumeng Local Level Government Council, Bulolo District of Morobe Province, Papua New Guinea*. Papua New Guinea University of Technology.

Conference Papers

Ambelye, I., & Makara, S. (2024, May 9–10). *Association of Asian Social Science Research Councils (AASSREC) Regional Summit*. Bangkok, Thailand.

Gilder, E. (2024, September 8–10). *The Ratiu Dialogues on Democracy 2024: The return of history* [Conference session]. Ratiu Ideas Forum in cooperation with the London School of Economics, Turda, Romania. https://ratiuforum.com/ratiu-dialogues-2024/

Gilder, E. (2024, September 25–28). *Sibiu Cybersecurity Dialogues: Digital humanism in the cyber age—Reflecting a decade of cybersecurity evolution and pioneering the next 10 years* [Conference session]. Sibiu, Romania. https://cybersecurity-dialogues.ro/past-editions/sibiu-congress-10th-edition/

Publication Award

Kialo, D., Siaguru, F., Ambelye, I., Blacker, J., Yalambing, L., Betasolo, M., Aisoli-Orake, R., Denano, S., Gasson, S., & Bue, V. (2023). Successful Higher Degree Researcher Pathways in a Developing Country – Papua New Guinea. In S. Gasson, J. Blacker, I. Stoodley, A. Winter, & C. Bruce (Eds.), *Confident supervisors: Creating Independent Researchers* (e-Book). James Cook University. https://jcu.pressbooks.pub/confidentsupervisors

Award: Open Education Global Award of Excellence (2024, September 23).

FACULTY OF NATURAL RESOURCES

SCHOOL OF AGRICULTURE

Head of School: Professor Macquin Maino

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

The School of Agriculture has 17 qualified academic staff members (13 with PhDs and 4 with Masters). In 2024, four students graduated with postgraduate degrees (1 with MPhil and 3 with MSc). The School of Agriculture is committed in delivering quality teaching, research, outreach activities and postgraduate training. School's activities are well guided by the School's Five-Year Strategic Development Plans (2005 – 2010, 2011 – 2015, 2016-2020, and 2021-2024). Now with the Unitech's Strategic Plan 2025-2029, an implementation plan has been prepared to carry forward research activities. The curriculum is enhanced through regular and periodic review in consultation with stakeholders and industries in the public and private sectors. The School of Agriculture has established strong collaborative research links with international developmental partners and stakeholders, including Australian Centre for International Agricultural Research (ACIAR) and New Zealand AID. Regular publication of the scientific journal '*Niugini Agrisaiens*' and academic staff publishing scientific papers regularly confirm the department's strong commitment in research at PNGUoT. Strong collaborative research collaborations exist with PNG National Agricultural Research Institute (NARI), University of South Pacific (USP), Fiji, Charles Sturt University (CSU), Australia, National Research Institute (NRI) of Greenwich University (U.K.), South Australian Research and Development Institute (SARDI), Australia, University of Canberra, Australia, Curtin University, Australia, Queensland University of Technology (QUT), Australia and other NGOs, industries and institutions further cements our strong leadership in agricultural research. Other publications, compilation of abstracts of research done by the postgraduate students, Annual Reports, Farm Report and Strategic Plan on annual basis also strengthens the school's research capacity. In 2016, Unitech Biotechnology Centre (now the Centre for Excellence in Biotechnology) was amalgamated to the School of Agriculture for the administrative oversight.

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

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

AREAS OF RESEARCH

Research Focus Area – 1: Crop Sciences

- Evaluation Of Promising Rice Varieties For Papua New Guinea
- Crop Improvement and Adaptation to Stress Environments Caused by Climate Change
- Use of *Trichoderma* Spp. as a Biocontrol Agent Against Some Selected Soil Borne Pathogens
- Study of the Production Technology and Practices of Selected Crops by Farmers in Different Agro-Ecological Regions of Papua New Guinea
- Study of the Production Technology and Practices of Selected Vegetables by Farmers in Different Agro-Ecological Regions of Papua New Guinea

- Soil N and Composting in Sweet Potato-Based Farming Systems
- Symbionts as Potential Biocontrol Agent for Cocoa Pod Borer
- Development of a Maize Seed System for PNG
- Gene Discovery in PNG Wild Rice: Seed and Grain Characteristics
- Genetic Transformations of Taro and Rice
- Quantification of Greenhouse Gases (GHG) Emissions from Soils Under Major Cropping Systems of Papua New Guinea
- Development of Fungal Inoculum for Artificial Agar Wood Production in PNG

Research Focus Area – 2: Livestock Sciences

- Conservation of Farm Animal Genetic Resources
- Utilization of Crop Wastes and Agro-Industrial By-Products for Feeding Livestock and Poultry
- Determining Digestibility of Locally Available Feed and Fodder
- Determination of Anti-Nutritional Factors in the Fodder Crops of PNG
- Development of Suitable Weaner Piglets' Diet
- Smallholder Aquaculture Development in PNG

Research Focus Area – 3: Agricultural Economics

- Economic Efficiency of Small-Scale Rice Farming
- Technical Efficiency of Smallholder Coffee Farming
- Resource Use Efficiency Among Small-Scale Peanut Farmers

Research Focus Area – 4: Agricultural Extension and Rural Development

- Evaluation of On-Going Extension Approaches in PNG and Their Effectiveness in Rural Livelihood Improvement
- Problems and Prospects of Retaining Youth in Agriculture in PNG
- Identifying the Present Farming Systems in Different Regions of PNG and Scope for Improvement
- Examining Household Food Security in Peri-Urban Settlements
- Livelihoods of Settlers in Peri-Urban Settlements
- Return From Investment in Higher Education, Extension and Innovations
- Entrepreneurship Development among Rural People
- Women in Agriculture for Food Security
- Diffusion of Agricultural Innovations among Rural Community

Research Focus Area – 5: Post-Harvest Technology

- Survey on Current Status of Mechanization In PNG: Impact Study of Mechanization on Rural Livelihood and Environment
- Development of Post-Harvest Technology and Post-Harvest Management Systems for Horticultural Crops In PNG
- Investigation of Intermittent Microwave Drying System on Nutritional, Physiochemical and Phytochemical Properties
- Effect of Storage Techniques on Dried Food Products Nutritional and Phytochemical Properties.

Research Interests of Academic Staff

No	Academic staff	Areas of research interest
1	Professor Peter Manus	Agricultural Economics, Agribusiness Management
2	Professor Macquin Maino	Plant Pathology, Nematology, Biocontrol Agents, Plant Physiology
3	Professor Rajashekhar Rao B.K.	Soil Science, Soil Quality, Soil Fertility, Soil Pollution, Agricultural Chemistry

4	Professor Gariba Danbaro	Animal Breeding, Animal Management Systems, Research Methods
5	Professor Tom Okpul	Plant Breeding and Genetics, Tissue Culture, Biotechnology
6	Dr Jayaprakash	Veterinary Science, Animal Nutrition, Animal Health and Diseases
7	Dr Veronica Bue	Agricultural Extension, Women in Agriculture, Rural Sociology
8	Dr Patrick Michael	Natural Resource Management, Field Crops, Agriculture and Environment
9	Dr Ronnie Datoana	Agricultural Entomology, Integrated Pest Management, Bio Control Agents
10	Dr Gwendolyn Ban	Plant Pathology, Bio Control Agents
11	Dr Spencer Poloma	Crop Physiology,
12	Dr Janet Pandi	Animal Nutrition, Feed and Nutrition of Chickens in Smallholder Farming Systems.
13	Dr Frank Vidinamo	Post-Harvest Technology, Food Science, Drying Technology, Farm Machinery, Agriculture Field Engineering, Soil Compaction
14	Mr Nick Kewa	Agricultural Economics, Climate Change and Supply Chain Management
15	Mr William Nano	Agricultural Extension, Animal Nutrition, Aquaculture, On-Farm Trainings
16	Mrs Betty Tiko Motoro	Agricultural Extension, Rural Sociology

Postgraduate Student Research

Student	Program	Research Title	Supervisor
Francis N'DREWEI	PhD	*Examining the Effectiveness of Agricultural Extension Approach Implemented by the Manus Provincial Division of Agriculture and Livestock: A Case Study of Lele Bupi Chupeu and Balopa Local Level Government Areas*	Dr V Bue & Prof. P Manus
Lucy Maino	PhD	*Impacts of Integrated Development Approaches on the Livelihoods of Rural People: A Case Study in the Oro Province of Papua New Guinea*	Dr. V. Bue
Betty Tiko Motoro	PhD	*Gender Differences in knowledge, Perceptions, Attitudes and Skills of PNG Coffee Players in the e-Commerce Space*	Dr. V. Bue
Benson Mirou	PhD	*Development of e-crop Disease App for Farmers in Papua New Guinea*	Prof. M Maino (Co-supervisor)
Michael Gaoma	PhD	*Cultural Intelligence and Transitional Physics Education in Papua New Guinea*	Maino (Co-supervisor
Eko Maiguo	PhD	*Investigating the Exotic Trees and Their Agricultural Land-Use Significance in the Morobe Province, Papua New Guinea*	Prof. M. Maino (Co-supervisor)
Sinafa Robby	PhD	*Characterization of Leptospira Spp. (Bacteria) in Cattle Population in the Morobe Province*	Prof. M Maino

Paula Kaupa	PhD	*Green Manure Integration as an INM Option in Sweet Potato: Effects on Soil Properties, Crop Nutrition and Productivity*	Dr R Rao
Timothy Bafiac	PhD	*Soil Quality Assessment and Responses of Zinc (Zn) to Maize Production in Markham Valley*	Prof. R. Rao
Denano Sogoing	PhD	*Ecological Risk Assessment of Markham River and its Tributaries: A Case Study in Relation to Heavy Metals Contamination and Phyto-remediation*	Prof. Tom Okpul (Co-supervisor)
Nick Kewa	PhD	*Value Chain Analysis of Taro: The Case of Marhkam District, Morobe Province, Papua New Guinea*	Prof. Peter Manus, Prof. Tom Okpul (Co-Supervisor)
Naomi. S. Gomuna	MPhil	*Comparative Analysis of Food Safety and Phytosanitary Measures for Importing PNG Taro into Australia, New Zealand, Japan and USA*	Prof. Tom Okpul
Shienel Samuel	MPhil	*Investigating the Effects of Ants (Wasmannia auropunctata & Oecophylla smaragdina) as Potential Biological Control Agents against Cocoa Pod Borer (Conopomorpha cramerella) in Madang & East Sepik Province*	Dr. R Dotaona
Shen Sui	MPhil	*Maximizing Sweet Potato Yield in the Swidden Fields Along an Altitudinal Gradient in Papua New Guinea.*	Dr. P Michael
Jimmy Tela Ambang	MPhil (Part-time)	*Assessing Postharvest Loss of Bulb Onion by Farmers in Jiwaka Province*	Dr. Frank Vidinamo
Vincent Koddy	MPhill	*Concentration of Alkaloids, Arecoline, Arecaidine and Guvacine in Arecanuts from Papua New Guinea*	Prof. M Maino
Inia Bunsa	MPhil	*Investigating Endemic Nature of Abuscular Mycorrhizae Fungi on Piper aduncum*	Prof. M Maino
Stephanie Anis	MPhil	*Chemical and Biological Properties of Volatile Beta-Triketones and Terpenes of the Leaves of Two of Four Xanthostemon Species in Papua New Guinea.*	Prof. M. Maino (Co-supervisor)
Peter Aiyon	MPhil	*Presence of Races of Root-knot Nematode, Meloidogyne spp. in Papua New Guinea*	Prof. M. Maino
Elizabeth Owa	MPhil	*Agricultural Innovations Adopted by Village Community Educators and its Impact on Their Family Livelihoods in Selected Villages in Jiwaka province, Papua New Guinea*	Dr. V. Bue
Rebecca Imbok	MPhil	*Constraints Faced by smallholder Coffee Farmers in Accessing Coffee Specialty Markets: A Case Study of Wain-Erap Smallholder Coffee Farmers in Nawaeb District of Morobe Province, Papua New Guinea*	Dr. V. Bue
Pauline John	MPhil	*Uncovering Environmental Risk of Metal (loid)s Contamination in Food Gardens of Lae's Peri Urban Areas, Papua New Guinea*	Prof. R. Rao
Timothy Poy	MPhil	*Evaluation of Indigenous Clay Materials for Nickel Decontamination Potential*	Prof. R. Rao

Obert Lou	MPhil	*Assessment of Live Weight Gains, Feed Intake and Feed Digestibility for Goats fed Elephant Grass (Pennisetum purpureum), mixed with Leucaena leucocephala in Papua New Guinea*	Prof. G Danbaro
Willie Peilyn	MPhil	*Estimation of Apparent Metabolizable Energy and Growth Performance of Broiler Chickens fed Sorghum based diets.*	Prof. G Danbaro
Lisahpo Wawah	MSc	*Evaluating the Ploidy Level and Drought Tolerance of Dasheen×Eddoe Taro Hybrids*	Prof. Tom Okpul
Raylin Puring	MSc	*Evaluation of Reciprocal Progeny Population of Two Corn Varieties*	Prof. Tom Okpul
Mark Warendo	MSc	*Investigating Drought Tolerance amongst Promising Dasheen and Eddoe Taro Varieties from Papua New Guinea*	Prof. Tom Okpul
Godfrey Hannet	MSc	*Agro-morphological Characterization of the Galip Nut (Canarium indicum) Population Maintained at the NARI-Kerevat Arboretum, East New Britain Province*	Prof. Tom Okpul
Job Sam	MSc	*Insecticidal Activity of Biotoxin Extracts from Native Entomopathogenic-Associated Bacterium*	Prof. M. Maino
Josaiah Ayodele	MSc	*Adoption of Agricultural Technology and Its Effect on Youth: A Comparative Study Between Papua New Guinea and Nigeria*	Dr. V. Bue
Esther Eze	MSc	*Exploring Household Decision-Making Dynamics in Climate-Smart Agriculture Adoption among Smallholder Farmers: A Comparative Analysis of the Selected Communities between Papua New Guinea and Nigeria*	Dr. V. Bue
Jeffrey Tanakae	MSc	*Potential of Vetiver Grass in Phytoremediation of Some Toxic Heavy Metals in Soil*	Prof. R Rao
Dollah Inapo	MSc	*Biodiversity and Phylogeny of Trichoderma Isolates in Papua New Guinea*	Dr G Ban
Roberta Sio	MSc	*Megatherium as a Potential Biological Control Agent for Coconut Rhinoceros Beetle in PNG*	Dr R Dotaona
Topas Malapin	MSc	*Soil to Nutrition-the Importance of Composted Mounds for Sustainable Production of Sweet Potato in Papua New Guinea*	Dr P Michael
Levy Kasa	MSc	*Agricultural Use of Treated Piggery Sludge (TPS) to Minimize Negative Environmental Impacts Under Humid Lowland Tropical Climatic Conditions*	Dr P Michael
Shirleyna Aipa	MSc	*Evaluating the Importance of Organic Matter and Inorganic Fertilizer (NPK) Application on Growth and Bean Yield of Cocoa Produced Under Lowland Agro-Climatic Conditions in PNG*	Dr P Michael
Luke Jeffery	MSc	*Agricultural Use of Treated Domestic Sewage Effluent (TDSE) Wastewater to Minimize Negative Environmental Impacts Under Lowland Tropical Climatic Conditions*	Dr P Michael
Cybill Poiya	MSc	*Assessing the Genetic Relationships, the Wild Relatives of Rice Maintained at the Unitech Biotechnology Centre Using Simple Technique Repeat Markers (SSR)*	Prof. T Okpul

Peter Kerowane	MSc	*Value Chain Analysis of Bulb Onion in Gembogl, Simbu Province, Papua New Guinea*	Mr N Kewa
Miriam Otto	MSc	*Developing an Information System for Morobe's Smallholder Cattle Farmers Towards Sustainable Cattle Production*	Mr N Kewa

Undergraduate Students' Research Projects

No	Name	Research Topic	Supervisor/s
1	Shirleyanna Modudula	*Isolation and Identification of Trichoderma spp. Along the Coast of Salamaua*	Dr. Ban
2	Jenny Vilivili	*Isolation and Identification of Trichoderma spp. along Markham Valley*	Dr. Ban
3	Susanne Koli	*The Effect of Trichoderma Against Root Knot Nematode*	Dr. Ban
4	Talitha Kamies	*Assessing the Subsidized Shipping of Vegetable Crops by PNG Government During and After Covid-19*	Dr. Ban/Ms. Parau
5	Joanne Mossing Yawing	*The Antibacterial Resistance of E. coli in Farmed Broilers*	Dr. J Prakash
6	Nancy Moses	*Antimicrobial Resistance of Salmonella spp.in broiler Farms*	Dr. J Prakash
7	Obert Jim	*Formulating Fish Feed Using Sweet Potato as the Main Ingredient*	Mr. Nano
8	Pathrina Peter	*Utilizing Cocoa Pod Husk as a Major Ingredient for Fish (Tilapia)*	Mr. Nano
9	Lilly-Jean Awute	*Potential of Coffee Pulp in Animal (Goat) Feed*	Mr. Nano
10	Belinda Dopaim	*Effects of AMF Application on Rice Seedling Growth Under Glasshouse Condition*	Dr. Poloma
11	Sheridan Tringin	*Effects of AMF Application by Seed Soaking on Early Seed Germination Rice Seedlings Under Greenhouse Conditions*	Dr. Poloma
12	Junior Peng	*Effects of Arbuscular Mycorrhiza Fungi on Cocoa Seedling Growth Under Nursery Conditions*	Dr. Poloma
13	Nadia-Marie Solongo	*Effects of Tephrosia on Taro Beetle Infestation*	Dr. Dotaona
14	Jonathan Bahude	*Allelophatic Potential of Tephrosia vagelii on Weeds of Colocasia esculenta in the Lowlands of PNG*	Dr. Dotaona
15	Betty Tokam	*Virulence of Entomopathogenic Fungi on Coleopteran Species*	Dr. Dotaona
16	Israel Daviaga	*Using Shredder to Utilize Nutrient Potential of Crop Residues, and Leaves as Livestock Feeds and Fertilizer to Improve Soil Nutrients*	Dr. Mohamed
17	Morgan Lulu	*Using Shredder to Utilize Nutrient Potential of Crop Residues, and Leaves as Livestock Feeds and Fertilizer to Improve Soil Nutrients*	Dr. Mohamed
18	Jenivoh Konafo	*Cocoa DNA Extraction for Barcoding*	Prof. Okpul

19	Schneider Ngahan	*Production of Tetraploid Watermelon for Triploid Production*	Prof. Okpul
20	Athurnasia Sitapai	*Regeneration of Rice through Tissue Culture*	Prof. Okpul
21	Ernestine Posing	*Evaluation of Media Types for Locally Grown Mushrooms*	Prof. Okpul
22	Lester Jnr Mitigei	*Presence of 3 major Meloidogyne spp. (Root-knot nematode) at the Agriculture Farm, PNGUoT*	Prof. Maino
23	Richard Sirifave	*Screening of a New Rice Variety for Fungal Disease Infection*	Prof. Maino
24	Jacqueline Steven	*Incidence of Black Pod Disease on 18 Hybrid Cocoa Clones*	Prof. Maino
25	Theresa Narawen	*Perceptions of Farmers on Bulb Onion Farming at Markham Valley: Village 1*	Ms. Tiko
26	Thomas Kongragle	*Perceptions of farmers on Bulb Onion Farming at Markham valley: Village 2*	Ms. Tiko
27	Kale Wemin	*Effect of Green Manure Based INM practice on Sweet Potato Nutrition*	Prof. Rao
28	Shantella Alei	*Nitrogen Accumulation and Distribution Pattern in Selected Green Manure Crops*	Prof. Rao
29	Julie Palisa	*Residual Fertility (Primary Nutrients) of Soil Following Green Manure Based Integrated Nutrient Management in Sweet Potato*	Prof. Rao
30	Debra Kesco	*Status of Secondary Nutrients in Soil Fallowing Green Manure Based Integrated Nutrient Management in Sweet Potato*	Prof. Rao
31	Gabriella Turi	*Micro Nutrients in Soil Subjected to Green Manure Based Integrated Nutrient Management to Sweet Potato Crop*	Prof. Rao
32	Junior Tundar	*Effects of Drying Methods on Textural Structure of Fruits*	Dr. Vidinamo
33	Samuel Hataya	*Investigating the impact of Modified Atmosphere Packaging on Prolonging Self Life and Quality of Fresh Produce in PNG*	Dr. Vidinamo
34	Natasha Alben	*Effects of Storage Condition on the Nutritional Quality of Fruits*	Dr. Vidinamo
35	De'vii Kaieso	*Value Chain Mapping of Taro Farmers in Nawab District in Morobe Province*	Mr. Kewa
36	Junior Sefo	*Productive Performance of Broiler Production at Unitech Farm*	Prof. Manus
37	Jefferey Poiye	*Productive Performance of Egg Production at Unitech Farm*	Prof. Manus
38	Carlos Padapu	*Productive Performance of Pig Production at Unitech Farm*	Prof. Manus
39	Sinclair Yakai	*Frequency of the Kappa Casein Gene in a Local Population of Goats in PNG*	Prof. Danbaro
40	Karen Tairo	*Frequency of a Prolactin Gene Variant (VIP) in a Local Chicken Population of PNG*	Prof. Danbaro

41	James Ngunts	*Perception of First Year Students Regarding the Issue of Laptops for their Studies*	Dr. Bue/Ms. Parau
42	Berry Karwell	*Survival Strategies of Households in the Formal Sector in Madang Block Peri-Urban Settlement*	Dr. Bue/Ms. Parau
43	Gareth Alumedi	*Demography of Street Children in Lae City*	Dr. Bue/Ms. Parau
44	Jeromu Kwalam	*Evaluating Form of Presentation (Crumble vs Mini Pellet) of a Broiler Grower Diet and on Farm Performance of Broiler Chickens Fed these Diets*	Dr. Pandi
45	Junita Kenken	*Testing an On-Farm Grower Pig Ration*	Dr. Pandi
46	Roseleah Werai	*Growth of Broiler Chickens Fed a Grower Diet from 14 To 35 Days Post Hatch*	Dr. Pandi
47	Prisca Tiru	*Investigating the Effects of Rubber Tree Fallen Leaf Biochar on Soil Properties*	Dr. Michael
48	Ezekiel Bobby	*Investigating the Effects of Fallen Oil Palm Leaf Biochar on Soil Properties*	Dr. Michael
49	Denzel Alois	*Investigating the Effects of Coconut Husk Biochar on Soil Properties*	Dr. Michael
50	Lawrence Kavie	*Investigating the Effects of Cocoa Pod Biochar on Soil Properties*	Dr. Michael
51	Terence Sauna	*Investigating the Effects of Coconut Shell Biochar on Soil Properties*	Dr. Michael

Journal Articles

Gossie, M. P., & Rajashekhar Rao, B. K. (2024). Quantification of soil nutrient stocks and stoichiometric ratios in *Eucalyptus pellita* biomass plantation chronosequence in Papua New Guinea. *Catena, 247*, 108564. https://doi.org/10.1016/j.catena.2024.108564

Inapo, D., Ban, G., & Akanda, S. (2024). Identification and distribution of *Trichoderma* species in the four regions of Papua New Guinea. *Interdisciplinary Journal of Papua New Guinea University of Technology, 1*(1), 59–67.

Stella, B. P., & Rajashekhar Rao, B. K. (2024). Health risks of metals in soils and staple foods of the subsistence food gardens in the floodplains of Watut River, Papua New Guinea. *Environmental Monitoring and Assessment, 196*, 12765. https://doi.org/10.1007/s10661-024-12765

Timi, D., Maino, M., & Gopalakrishnan, S. (2024). Nematicidal assessment of plant-mediated green synthesized silver nanoparticles under laboratory conditions. *Transactions on Engineering and Computing Sciences, 12*(1), 215–225.

Conferences/Symposium Presentations

Ayodele, O. J., & Bue, V. (2024, July 1–4). *The Extent of Adoption of Agritech by Youth Farmers in PNG and Nigeria for Sustainable Food Production*. Paper presented at the 7th National Science and Technology Conference, PNG University of Technology, Lae, Papua New Guinea.

Baiga, R., Dom, M., & Rajashekhar Rao, B. K. (2024, July 1–4). *Nitrogen Mineralization in an Acid Soil Following Biochar and Urea Co-Application and its Effect on the Growth of Chinese Cabbage* (pp. 57–

58). Paper presented at the 7th National Science and Technology Conference, PNG University of Technology, Lae, Papua New Guinea. Papua New Guinea Science and Technology Secretariat.

Danbaro, G. (2024, August 31). *Threats to the Farm Animal Genetic Resources of Papua New Guinea*. Paper presented at the Alliance University of India Webinar Series on Contemporary Research in Engineering Innovations.

Eze, E. O., Bue, V., Okpul, T., & Waki, J. (2024, July 1–4). *Comparative Analysis of Socioeconomic, Institutional and Cultural Dimensions of Climate-Smart Agriculture Uptake Among Smallholder Farmers in Selected Communities in Nigeria and Papua New Guinea*. Paper presented at the 7th National Science and Technology Conference, PNG University of Technology, Lae, Papua New Guinea.

Maino, M. K. (2024, April 26–27). *Policies and Programs on Agrifood System and Digital Agriculture in Papua New Guinea* (pp. 95–103). In Proceedings of the 2024 Asia Pacific Agricultural Policy Roundtable, Perbanas Institute, Jakarta, Indonesia.

Robby, S., & Maino, M. K. (2024, July 1–4). *Incidence of Leptospirosis Disease in Papua New Guinea: A Review*. Paper presented at the 7th National Science and Technology Conference, PNG University of Technology, Lae, Papua New Guinea.

Workshops/Presentations

Danbaro, G. (2024, August 7). *Postgraduate Training and Research at PNG University of Technology*. Paper presented at the ACIAR Meeting, Gateway Hotel, Port Moresby, Papua New Guinea.

Danbaro, G. (2024, August 13). *The Special Tertiary Admission Test (STAT-P) is Positively and Significantly Related with Performance of Students at PNGUoT*. Paper presented at the PSR&IC Weekly Seminar, Rose-Kekedo Foyer, PNG University of Technology, Lae, Papua New Guinea.

Danbaro, G. (2024, September 13). *Dean's Forum for Postgraduate Students*. Rose Kekedo Foyer, Papua New Guinea University of Technology, Lae, Papua New Guinea.

Danbaro, G. (2024, October 1). *Annual Postgraduate Student Seminar of PNGUoT*. Rose Kekedo Centre, Papua New Guinea University of Technology, Lae, Papua New Guinea.

Books and Edited Books

Jojo, P. J., Gilder, E., Rajashekhar Rao, B. K., Luhach, A. K., Sekac, T., Adu McVie, R. S., & Olatona, D. (Eds.). (2024). *Book of Abstracts (7th ed.) 7th Science and Technology Conference.* PNG University of Technology, Lae, Papua New Guinea

Maino, M. K. (2024). *Tomorrow My Son Will Come*. PUBLICIOUS Book Publishing Ltd. Brisbane, Australia, p.129.

Reports

Danbaro, G. (Ed.). (2024). *The Papua New Guinea University of Technology Research Report 2023*. The Papua New Guinea University of Tchnology. https://www.unitech.ac.pg/wp-content/uploads/2024/05/RESEARCH-REPORT-2023.pdf

Funding Acquired

Rajashekhar Rao & Student (2024). *Uncovering environmental risk of metal(loid)s contamination in food gardens of Lae's peri-urban areas, Papua New Guinea*. The Postgraduate Studies, Research & Innovations Committee of the PNG University of Technology approved K 18,000 for the student research project.

External Research Collaborators

Dr. Michael, Prof. Rao & team (2023). Co-investigators/Team member of CSIRO-ACIAR-Unitech project (ACIAR Project number-SLAM/2019/106) entitled *Better Soil and Land Information for Improving PNG's Agricultural Production and Integrated Land Use Planning – Building A Revitalized PNGRIS2*

Professor Danbaro (2024). Pacific Chicken Genetic Gains (PaCGG) project. Funded by Australian Center for International Agricultural Research (AUD 94,457.00) in collaboration with International Livestock Research Institute, and Pacific Agri-Enviro Consultants, Samoa.

Professor Danbaro & Professor Tadelle Dessie. International Livestock Research Institute, Nairobi, Kenya

Professor Danbaro & Dr Anna Okello – Research Programs Manager. Australian Center for International Agricultural Research

Professor Danbaro & A/Prof Siaka Diarra (2024). Pacific Agri-Enviro Consultants, Laloanea, Samoa.

Dr. Vidinamo, F. (2024). Advanced Drying and Sustainable Energy Research (ADSER) Group (https://research.qut.edu.au/adser/), QUT, Australia

Dr Pandi, J., Dr. Dotaona, R. & Team (2024). ACIAR Small Research Activity (SRA) LS/2024/144 Holistic Training, Baseline Surveys and Partnership Development for Black Soldier Fly Farming in PNG. A collaboration between PNGUoT (Agriculture) and NARI.

Dr. Dotaona (2024). Trukai Agro Industries – weed-rice allelopathy research collaboration

Number of Papers Reviewed for Journals/ Conferences/Seminars

Prof. R. Rao	14
Dr. V. Bue	2
Dr. F. Vidinamo	6
Dr. R. Dotaona	4

SCHOOL OF FORESTRY

Head of School: Dr Cossey K. Yosi

Introduction

The School of Forestry (SoF) at the Papua New Guinea University of Technology (PNGUoT) has built a strong reputation for providing exceptional training in tropical forestry. Situated on the traditional lands of the Ahi people, the institution holds significant cultural importance. Students attending the Taraka (SoF), Bumbu (TFTC), or Bulolo (BUC) campuses can expect a consistent and comprehensive curriculum.

The Timber and Forestry Training College (TFTC), which joined the School of Forestry in 2023, offers a two-year Diploma in Wood Science and Technology. In contrast, Bulolo University College (BUC) offers a three-year Diploma in Forestry (DipFor) program. Both institutions have a proven track record of producing highly skilled graduates. Additionally, BUC has expanded its offerings by introducing a Bachelor of Forest Resource Management in Forestry (BFRM) program, which started in 2023.

The Taraka campus provides a four-year Bachelor of Science in Forestry (BScF) program known for its extensive field coverage. These programs are designed to equip students with the skills and knowledge necessary for excelling in tropical forestry. Furthermore, the Taraka campus supports postgraduate studies, offering resources and guidance for MPhil to Ph.D. programs.

The faculty consists of experienced professionals who have made significant contributions to the field of forestry. The school offers outstanding resources to facilitate practical student learning and has established strong connections with the industry. This enables students to engage in projects and interact with industry experts for research, professional experiences, or employment opportunities.

The mission of the SoF at PNGUoT is to produce highly skilled professionals equipped with the technical expertise necessary for the sustainable management of the country's forest resources. The school is committed to training both men and women to become leaders in the field, recognizing that proper forest management benefits local and national economies and ensures the well-being of present and future generations. By imparting knowledge and skills, the school aims to manage forests efficiently to achieve desired outcomes.

PNGUoT prioritizes education, and the SoF is dedicated to providing outstanding academic and administrative support to undergraduate and postgraduate students. The postgraduate curriculum is designed to enhance research capabilities, building on the foundational knowledge acquired in third-year courses such as "Research Methodology, Design, and Data Analysis." Students undertake a Final Year Research Project in their fourth year, providing additional opportunities to strengthen their research skills.

At the core of our educational mission is cultivating competent forestry experts. The school focuses on equipping students and professionals with essential technical skills to address challenges in the field. To achieve this, we prioritize research initiatives crucial for developing problem-solving abilities. Therefore, SoF ensures that our faculty is well-versed in research and actively engaged in various research projects and programs.

By the end of the University's academic year 2024, the SoF has made significant progress, guided by the Five-Year Strategic Plan. This plan directs research activities with specific objectives and addresses challenges, reflecting the school's commitment to enhancing research and marking a crucial milestone in its development.

The SoF strives for academic excellence. It aims to train highly skilled professionals, aligning with the University's vision: "To Grow World-Class Technocrats for the Real World by 2024 and beyond."

In light of recent changes in the University's academic structure, the SoF has initiated a benchmarking exercise to identify a model university. For this purpose, we have chosen the University of Canterbury in New Zealand. This is just the initial phase; once completed, the school will seek full accreditation for its undergraduate courses to ensure they meet international standards.

Thus, the SoF is committed to preparing the next generation of technocrats to tackle real-world challenges. We aim to contribute to the University's strategic plan through our academic and research activities. Our collaborative approach fosters a world-class academic community that transcends typical academic boundaries.

Forestry Research Themes

The SoF has recognized the diverse value of Papua New Guinea's forests and has incorporated it into its academic and research programs. Achieving sustainable forestry in PNG requires an interdisciplinary approach that blends economic, social, environmental, and climate change aspects. To this end, SoF has developed a Research Development Plan and Postgraduate Study Program focusing on several research themes. The following are some crucial themes related to forests and the environment:

- Ecosystem and Environmental Services
- Sustainable Forest Management
- Forest Biology, Ecology, and Biodiversity
- Forest (Health) Protection
- Wildlife Management, Community-Driven Forest Conservation
- The Role of Forests in Climate Change
- Silviculture (including Reforestation and Plantation Management)
- Agroforestry, Social and Community Forestry, Multiple Land Use
- Wood Science and Technology, Timber Products, and Industries/Utilization
- Forest Engineering
- Forest Policy, Economics, and Forest Product Marketing
- Appropriate Technology
- Remote Sensing and Geographic Information Systems
- Biomass Energy

In the 2024 academic year, the SoF had 39 academic staff members responsible for delivering lectures and conducting research. Two staff members from the Taraka campus have been on long-term study leave since 2022, locally and overseas; one resumed their teaching roles in 2024 and 2025, respectively, at the Taraka campus.

Faculty Members

During the academic year 2024, the Forestry School had a faculty of 39 academic staff members, as indicated in the following table. The table presents a comprehensive list of the academic staff at the Forestry School (Taraka, Bumbu, and Bulolo campuses), their respective positions, qualifications, and areas of research interest. It is worth noting that the school oversees the Taraka, Bumbu, and Bulolo Campuses in terms of academic matters.

Academic staff at the Taraka (SoF), Bumbu (TFTC), and Bulolo (BUC) campuses, their positions, qualifications (degrees), and research interest(s).

Name	**Position**	**Qualifications (Degree)**	**Research Interest(s) / Specialization**
Dr. Cossey Yosi	HoS and Associate Professor	Ph.D., MSc., BScF, DipFor, PCSCT	Tropical Forests Dynamics; Natural Forests Management; Forest Policy, Law and Legality; Natural Forest Silviculture; Forest Sampling; Payment for Forest Ecosystem Services; Climate Change and REDD+; Social and Community Forestry; Forest Certification; Environmental Impact Studies
Mr. Peter Edwin	Lecturer 2	MScF, DipFor, BScF, PCSCT	Wood Science and Technology; Forest Management

Mr. Haron Jeremiah	Lecturer 2	MSc., DipFor, BScF, PCSCT	Forest Economics and Marketing
Mr. Diaiti Zure	Lecturer 1	MScF, MAgr, BScF	Silviculture, Forest soils, Ecological Agriculture, Environmental Biotechnology, Environmental Virology
Mr. Leonard Wana	Lecturer 1	MSc., BScF, DipFor, PCSCT	Forest Inventory and Geographic Information Systems
Mr. Billy Bau	Lecturer 2 Deputy HOD & Curator – Herbarium	MSc., BScH, BSc., PCSCT	Plant Botany; Herbarium Curation; Plant Taxonomy; Botanical Collection with Ecological and Biodiversity studies
Mr. Eko Maiguo	Principal of Bulolo University College (BUC) Lecturer 2	MSc., BScF, DipFor, PCSCT	Silviculture and Forest Management
Mr. Louis Veisami	Lecturer 1	MPhil, BScF, DipFor, DipEPA, CertFMP, PCSCT, Cert Advance Research Method 2	Forest Mensuration and Inventory
Mr. Benson Gusamo	Lecturer 2 Postgraduate Coordinator	MSc., BScF., DipFor, PCSCT	Wood Science and Technology, Forest Products and Industries, Non-timber Forest Products, Bio-energy, Forest Protection, Timber Business, and SMEs
Mr. Bazakie Baput	Lecturer 1	MFSc., PGCert., BScF	Community/Social Forestry and Extension; Forest Policy and Legislation; Forest Certification; agroforestry and Forest Soils; Forest Ecology
Mr. Olo Gebia	Lecturer 1 Deputy Principal BUC	MPhil, DipFor., PCSCT	Forest Ecology and Plant Biology; Forest Biodiversity
Mr. Tombo Warra (on study leave in the country)	Technical Instructor 1	BScF	Plant Eco-physiology and Conservation Ecology
Ms. Priscilla Menin	Technical Instructor 1	BSc., PCSCT	Community Forestry, Communities' Response on Forest Plantation and Projects
Mr. Leonard Hans	Technical Instructor 1	BScF	Phytoremediation - Plant/soil and Toxic Chemical Relationship
Professor Yusuf Sudo Hadi	Professor	Ph.D., MSc, BSc.	Wood Science and Technology; Forest Management
Dr. Jimmy Moses	Lecturer 2	Ph.D., MSc., BSc.H., BSc.	Entomology, Spatial Ecology, Macroecology, Data Science
Mr. Gibson Sosanika	Lecturer 1	MPhil, BSc., PCSCT	Botany, Forest Ecology, Forest Conservation, Ecosystem restoration
Mr. Leroy Moripi	Lecturer 1 AQAT Subject File Coordinator and Library Representative	MPhil., BSc., PCSCT	Soils and Soil Carbon, Climate Science and Climate Change

Mr. Charles Feriwok	Lecturer 1	MPhil, BScF, DipFor	Forest Biomass and Energy
Mr. Martin Karikara	Technical Instructor 1	BScF.	Forestry, Soil, and Ecology
Mr. Koniel Alis	Technical Instructor 1	BScF.	Forestry and Ecology
Mr. Rapo Pokon	Part-time Lecturer	BSc.H., BSc.	Forestry and Ecology
Mr. Charles Tsiritsi	SAR-Deputy Principal	Not Available	Not Available
Mr. Morean Simeon	Principal, TFTC Bumbu Campus	Not Available	Timber Business and Market Dynamics of Wood Products; Assessing Business Viability in a Sustainable Economy
Mr. Steven Komut (On study leave)	Not Available	BScF	Wood Science &Amp; Technology, Wood Products, And Processing Technology.

Research Programs

The School of Forestry is dedicated to advancing research in environmental and forest management in Papua New Guinea. As outlined in next table, the school has established an active research program organized by general theme, project name, principal investigator, and research status.

The school's continuous research efforts aim to tackle crucial environmental and forest management concerns in Papua New Guinea. By teaming up with external organizations, the school secures funding and support for these long-term studies, ensuring thoroughness and collaboration.

The SoF partners with external agencies to secure research funding and facilitates staff pursuing postgraduate studies during their leave. We aim to advance environmental and forest management research by implementing a dynamic research program that ensures the production of high-quality research through a collaborative approach and various activities.

The Forestry School has ongoing research programs for 2024 covering various themes led by experienced principal investigators. These programs provide insights into Papua New Guinea's forests and contribute to sustainable forest management practices. Several papers have been presented, and others are in preparation for publication.

General Theme	**Research Project / Topics**	**Principal Investigator**	**2024 Status**
1. Ecosystem and Environmental Services	1. Estimating CO_2 Sequestration from Permanent Sample Plots: An Investigation to Inform the Potential of Payment for Environmental Services (PES) for Papua New Guinea Communities	Dr. Cossey Yosi	Completed the paper and presented it at the Huon Seminar in August 2022. The manuscript is in Preparation for Publication.
2. Sustainable Forest Management	2. Estimating Exploitation Factors associated with Annual Allowable Cut (AAC) in Timber Concessions in PNG	Dr. Cossey Yosi	The first component was completed, and the final report was submitted to ACIAR in 2022. The Unitech Research Fund funded the second component, and the study is in progress.

3. Forest Ecology & Biodiversity	1. New Guinea Species of Ficus in Section Malvanthera (Moraceae)	Mr. Billy Bau	The paper was presented at the 2021 ASBS Virtual Conference.
	2. Investigate the Dynamics and Characterization of Biodiversity, Ecology, and Soil Physical Attributes Within the Natural Green Break Forests of Bulolo Plantation, Morobe Province in PNG	Mr. Olo Gebia, Mr. Sam Aguadi, and Mr. Martin Karikara	Work is still in progress, especially with preliminary data collection. Research is ongoing.
	3. Seed Conservation of Trees in Papua New Guinea Tropical Rainforests	Mr. Gibson Sosanika	The online database was established in 2018, and work is ongoing. In October 2022, further training was attained at Kew Gardens, UK.
	4. Secondary Succession and Elevation Affect Ant Communities in Papua New Guinea's Rainforests	Dr. Jimmy Moses	The manuscript is in preparation for journal submission in 2025.
	5. Nocturnal and Diurnal Bees Association with Pollination Ecology Along an Altitudinal Gradient (0-2300 m.a.s.l) in Papua New Guinea	Mr. Gibson Sosanika	A research collaboration with Dr. Simon Tierney - Western Sydney University. A final-year BSCF4 student will be engaged for preliminary sampling in 2025. Research grants will be secured, and the project will be executed in Morobe Province in 2025.
4. Mensuration - Measurements	1. Validating a Model Developed to Estimate Volume from the Weight of Klinkii Logs in Bulolo Pine Plantations	Mr. Louis Veisami and Mr. Eko Maiguo	Gathered data and analyzed for validation of the multiple linear regression model equation. Write-up in progress.
5. Silviculture, including Reforestation and Plantation Management	1. Importance of Araucariaceae for plantation development in Papua New Guinea	Mr. Benson Gusamo	I submitted a book chapter and am awaiting publication. Work is in progress.
	2. Balsa (*Ochroma pyramidale*) trial plot and seed orchard at a higher elevation	Mr. Bazakie Baput	The Balsa PSP trial plot and seed orchard were established in July 2024, and initial measurements were taken. Measurements will be taken six monthly for five years (until 2028).

Postgraduate Research Projects

SoF has achieved significant progress in postgraduate research, with twelve ongoing studies in 2024, including three PhD and nine MPhil projects. While most students progress well in their research, some remaining challenges must be addressed.

Three research students (a PhD and two MPhil) are nearing completion. This represents the commitment and determination of these individuals, as well as the invaluable guidance and encouragement from our School and external collaborators. Notably, these projects are mainly joint efforts with the New Guinea Binatang Research Center (BRC) and the Papua New Guinea Forest Research Institute (PNGFRI), whose collaboration has greatly aided the students' access to essential resources and expertise.

During the 2024 seminars, two first-year MPhil students confidently presented an in-depth study plan to the SoF. This demonstration of dedication and seriousness towards their research is a promising indication of the quality of work that will be produced. The success did not stop there, as one MPhil and a PhD candidate showcased their final research results at the Postgraduate Seminar held on 1-2, October, 2024. It was a noteworthy accomplishment, highlighting the students' unwavering diligence and the support system provided by the school and external collaborators.

The SoF also hosted various fourth-year student projects at the Taraka campus during two separate seminar series events in the first and second semesters of 2024. These projects reflect the varied research topics explored within the forestry field. A total of 44 project presentations were featured, as listed in Table 4. Academic staff from both campuses collaborated to ensure proper supervision and guidance. The Taraka campus was chosen for the end-of-semester presentations, where the students' hard work was presented. The SoF is committed to providing a supportive and conducive environment for undergraduate and postgraduate research studies. The school will continue working closely with the students to ensure they have the resources and support to produce quality research work.

The following table shows ongoing postgraduate research projects focusing on those expected to be completed in 2024. It lists important details about each project, including student name, study level, research topic, supervisors, and project status. This information helps track progress and ensure students receive adequate support.

No.	Student Name	Study level	Thesis / Research Topic	Internal Supervisor	External Supervisor(s)	2024 Status
1	Mr. Ben RULI	MPhil/3	*Interlinkages between Logging, Forest Conservation, Health, Well-Being, and Livelihoods in PNG and Tropical Forests Globally*	Associate Professor Cossey Yosi	Dr. Jo Middleton and Prof. Vojtech Novotny	The research study has been extended from 2022 to 2023 and is almost complete. The student is expected to graduate in 2024.
2	Mr. Cassey UVAU	MPhil/3	*Plant-Caterpillar Interactions in a Primary Lowland Forest of New Guinea*	Associate Professor Cossey Yosi	Prof. Vojtech Novotny	The thesis is printed and ready for review. The student is expected to graduate in 2026.
3	Ms. June MANDAW ALI	MPhil/3	*The Social and Cultural Influences on Sustainable Forest Management in Papua New Guinea Indigenous Forest Communities*	Associate Professor Cossey Yosi	TBC	The thesis is printed and ready for review. The student is expected to graduate in 2026.
4	Mr. Hayden WAGIA	Ph.D./4	*The Effect of a 20-Year El Niño Extreme on the Dynamics of Lowland Tropical Rainforest in Papua New Guinea*	Associate Professor Cossey Yosi	TBC	The student is expected to graduate in 2026.

5	Mr. Russel TARUTIA	Ph.D./4	*Deep Learning (AI) and Drones: A New Approach to Monitoring Forest Health on Plantations in PNG*	Associate Professor Cossey Yosi	Dr. Sailesh Samanta	Study suspended
6	Ms. Priscilla Menin	MPhil/2	*Assessing the Socio-Economic Impact of Forestry Pine Plantations on Local Communities: A Case Study of the Manki Clan in Papua New Guinea*	Dr. Jimmy Moses	Dr. Rachel Aisoli-Orake	The study began in the second semester of 2023 and is ongoing.
7	Ms. Ivy Kiele	MPhil/2	*Impacts of the Root System of Selected PNG Tree Species on Soil Erosion and Maintenance of Essential Plant Growth Nutrients*	Mr. Eko Maiguo Mr. Haron Jeremiah	TBC	The study began in the second semester of 2023 and is ongoing.
8	Ms. Christine Pokana	MPhil/2	*Elevational Impact on Ecological Interactions Between Queen Alexandra's Birdwing Butterfly and Aristolochia Host Plants in Managalas Conservation Area, Oro Province, Papua New Guinea*	Dr. Jimmy Moses	Dr. Jamnadass, Ramni, Dr. Harrison, Rhett, Dr. Unsworth, William, and Dr. Chris Dahl	The study began in the first semester of 2024 and is ongoing.
9	Mr. Israel Penu	MPhil/2	*Species Diversity and Above-Ground Carbon Stock Assessment of Mangrove Forest in Aluki, Morobe Province, Papua New Guinea*	Associate Professor Cossey Yosi	TBC	The study began in the first semester of 2024 and is ongoing.
10	Mr. Clifford Yaee	MPhil/1	*Species Richness and Community Composition of Frogs Along a Rainforest Elevation Gradient in Papua New Guinea*	Dr. Jimmy Moses	Dr. Steve Richards and Dr. Chris Dahl	The study began in the second semester of 2024 and is ongoing.
11	Ms. Natasha Maiguo	MPhil/1	*Rainforest Succession Dynamics on Landslides in Papua New Guinea*	Mr. Billy Bau	Dr. Pagi Toko and Dr. Timothy Whitfeld	The student registered in the second semester of 2024 but withdrew to study in New Zealand
12	Mr. Philip Topaiman Ouyoumb	PhD/1	*A Comparative Analysis of Different Silvicultural Treatments Over 16 Years on Forest Recovery and Tree Species Regeneration in a Selectively Logged Over Lower Montane Rainforest in Papua New Guinea: Implications for Timber Management, Carbon Storage, and Conservation Values*	Associate Professor Cossey Yosi		Started PhD study program in 2024

Undergraduate Research Projects

The undergraduate research projects conducted in 2024 spanned a diverse range of topics, as indicated in the next Table. The undergraduate research projects addressed crucial topics in environmental sustainability, categorized into themes such as tree propagation, forest ecology, and more. In the Tree Propagation and Growth category, 14 projects focus on enhancing methods like using fertilizers for Klinki seedlings and tissue culture for Intsia bijuga. The Forest Ecology and Management group, also with 14 projects, studied forest ecosystems, including disturbances, sustainable harvesting, and biomass carbon content. Two projects examined Soil and Plant Interactions to investigate how soil conditions affect the growth of African Mahogany. GIS and Remote Sensing projects utilized technology to map vegetation risks and estimate biomass for better resource management. Insects and Plant Interactions researched the roles of insects, such as ant behavior and Teak pollinators, in conservation efforts. The Plant Diversity and Conservation category assessed plant diversity in various habitats and the effects of invasive species through two projects. Additionally, three projects in the Policy and Management category analyzed forest policies and the roles of extension officers to improve logging governance. Lastly, four other projects explored topics like mushroom cultivation and mangrove planting to combat sea level rise, reflecting interdisciplinary interests.
The diverse research topics undertaken by 44 final-year students and their supervisors. The projects cover a wide range of areas, indicating the students' keen interest in exploring different fields of study.

No.	Student Name	Title	Principal Supervisor	Co-Supervisor(s)
1	Belari Manasupe	*Comparison of Plant-Soil Feedback Experimental Approaches for Testing Soil Biotic Interactions Among Ecosystems*	Mr. Leroy Moripi	Mr. Bazakie Baput and Dr. Jimmy Moses
2	Binde Rita	*Response of Klinki Seedlings to Application of 'Grow Hariap' Fertiliser*	Mr. Haron Jeremiah	
3	Blaisis Casia	*Unlocking Dormancy: Investigating and Implementing Strategies to Overcome Dormancy in Teak (Tectona grandis) Diasporas*	Mr. Haron Jeremiah	
4	Ginuo Luther	*Assessing the Efficiency and Viability of Root Cuttings in Vegetative Propagation of Teak (Tectona grandis): A Comparative Study with Traditional Propagation Methods*	Mr. Eko Maiguo	Mr. Haron Jeremiah and Dr. Jimmy Moses
5	Hwena Carol	*Tissue Culture of Intsia Bijuga (Kwila)*	Prof. Tom Okpul & Mr. Haron Jeremiah	Prof. Tom Okpul & Mr. Haron Jeremiah
6	Joe Jacinda	*Examining the Influence of Disturbance on Tree Species in Castanopsis Forest in Bulolo, Papua New Guinea*	Mr. Olo Gebia	Dr. Jimmy Moses
7	Joe Mathew	*Effect of Herbivory Damage on Young Understory Tree Species (Pometia Pinnata and Calophyllum inophyllum) along an Elevation Gradient*	Dr. Jimmy Moses	Mr. Benson Gusamo
8	Kavie John	*Comparing the Growth Performance of Four Indigenous Tree Species (Canarium indicum, Elaeocarpus angustifolius, Homalium foetidum, and Pometia pinnata), Associated with Various Spacing Trials at Situm Trial Site, Nawae District, Morobe Province, PNG*	Dr. Jimmy Moses	Mr. Haron Jeremiah

9	Kevin Robin	*Evaluating the Survival Potential of Canarium Indicum (Galip) Through Vegetative Propagation Technique Using Rooting Hormones (IBA & NAA).*	Mr. Haron Jeremiah	Mr. Diaiti Zure
10	Kilaverave Avabianca	*Utilizing ArcGIS Software to Develop a Vegetation Risk Map for Power Line Clearance in Lae*	Mr. Leonard Wana	Mrs. Deanne K. Naime
11	Kimblang Enson	*Allometric Volume Equations for Pinus Caribaea in Bulolo Plantation, Papua New Guinea: A Comparative Growth and Yield Assessment*	Mr. Louis Veisami	
12	Kol Joseph	*Growth Assessment of African Mahogany (Khaya senegalensis) on Different Soil Types in Papua New Guinea.*	Dr. Jimmy Moses	Mr. Billy Bau
13	Lawabua Andrew	*Growth performance assessment mixed species trial, Canarium indicum, Elaeocarpus angustifolius, Hoemalium foetidum and Pometia Pinnata in two different sites: Project Concept Report.*	Mr. Benson Gusamo	Mr. Anton Lata
14	Mai Enoch	*Rooting response of stem cutting portions (top, middle, and base) between Disopyros maritima and Gardenia papuana*	Mr. Haron Jeremiah	Mr. Eko Maiguo and Mr. Charles Feriwok
15	Mandom Francis	*Comparative Analysis of Plant Diversity in Open-Canopy and Closed-Canopy Microhabitats in the FRI Botanical Garden.*	Mr. Gibson Sosanika	Dr. Jimmy Moses
16	Marnapal Isimel	*Soil Carbon Stock variation between the Low-altitude and Lower Montane Forest Plantation of Pinus (Pinus caribaea) in Morobe.*	Mr. Leroy Moripi	Mr. Bazakie Baput
17	Micky Amanda	*Estimating Above ground biomass and carbon stock of klinki plantation using Remote sensing and GIS*	Mr. Leonard Wana	
18	Mockley Henson	*Analysing the spatial distribution of air pollution level in Lae city using GIS techniques.*	Mr. Leonard Wana	Mr. Samson Aguadi
19	Naurangi Kevin	*Trial Composition of Glulam from Plantation-grown Araucaria spp. and their Mechanical Properties*	Mr. Benson Gusamo	Professor Yusuf S. Hadi
20	Nimu Brown	*Friends or Foes? An experimental Assessment of Asian Weaver Ant vs. Fire Ant Aggressivity in Controlled and Field Settings.*	Dr. Jimmy Moses	
21	Nomoru Joelyn	*Performance of Taun Wildings During Recovery and Post-Planting Survival Rate in Reforestation and Afforestation Plantings*	Mr. Haron Jeremiah	Mr. Anton Lata
22	Otume Kelvin	*Community Composition and Structure of Plants and Insects in an Artificial Forest*	Dr. Jimmy Moses	Mr. Billy Bau
23	Palik Mary Madonna	*Understanding Key Pollinators and Flowering Phenology of Tectona grandis (Teak) in Situm, Morobe Province, Papua New Guinea*	Dr. Jimmy Moses	Mr. Anton Lata

24	Patari Kirigeno	*Vegetative Propagation of Eucalyptus Pellita by Leafy Stem Cuttings Using a Non-Mist Propagation*	Dr. Jimmy Moses	Mr. Anton Lata
25	Roana Falton	*Rooting Assessment of Sandalwood Stem Cuttings*	Mr. Eko Maiguo	Prof. Tom Okpul & Mr. Haron Jeremiah
26	Rofley Jojo	*Assessing the Institutional Role of Reforestation Facilitation in PNG*	Mr. Haron Jeremiah	
27	Salio Nona Tessa	*Comparing the Above Ground Live Biomass of a Secondary Forest Versus the Arboretum of PNG University of Technology in East Taraka, Lae – Morobe Province, PNG*	Dr. Jimmy Moses	Mr. Billy Bau
28	Serebut Bianca	*Status and Performance of Seed Trees in PNG*	Mr. Haron Jeremiah	Mr. Timothy Sawaraba
29	Silih Eronimus	*Tissue Culture of Eagle Wood Through Callus Induction by Leaf Cultures*	Prof. Tom Okpul & Mr. Haron Jeremiah	Prof. Tom Okpul & Mr. Haron Jeremiah
30	Timothy Robin	*Testing of Wood Mechanical Strength to Determine the Harvesting Rotation Age of Commercial Timber Tree Species at the Age of 20 and 25 years – Bulolo Plantation*	Professor Yusuf S. Hadi	Mr. Benson Gusamo
31	Tisap Anderson	*Estimating Total Volume, Biomass, and Total Carbon Content in PNG Unitech Arboretum*	Mr. Leroy Moripi	Mr. Gibson Sosanika
32	Tobias Niel	*Investigating Factors Affecting the Formation of Callus on Aquilaria crassna (Eaglewood) Explants*	Prof. Tom Okpul & Mr. Haron Jeremiah	Prof. Tom Okpul & Mr. Haron Jeremiah
33	Tunduwa Steward	*Rooting of the Eagle wood Stem on Various Rooting Media*	Mr. Haron Jeremiah	Prof. Tom Okpul
34	Uruaka Marcelle	*Association patterns of Pometia pinnata to Other Woody Species in Disturbed and Undisturbed Forest Areas of Bulolo*	Mr. Olo Gebia	Dr Jimmy Moses
35	Waninara Ruby	*Assessing Vulnerability of Lae Botanical Garden to Degradation, Using Presence of Invasive Plant Species as Indicator and Contributor*	Mr. Gibson Sosanika	Mr. Kipiro Damas
36	William Kisa	*Economic Analysis of Forest Management Policy in Logging Industries of PNG*	Dr. Cossey Yosi	
37	Winas Jacky	*Critique on Forest Extension Officers to be Implemented in PNG to Guide Small-Scale and Large-Scale Logging Operations*	Dr. Cossey Yosi	Mr. Bazakie Baput
38	Wilson Wesley	*Micro-propagation of Cryptocarya masoy*	Mr. Haron Jeremiah	Prof. Tom Okpul
39	Womting Exile	*Assessing Anti-Termite Activity of Wood Treated with Crude Animal Fluids*	Mr. Benson Gusamo	Dr. Jimmy Moses

40	Glawe Ezidor Junior	*Assessing Skid-Trail Networks to Reduce Skidding Cost and Soil Disturbance for Ground-Based Timber Harvesting Operations in Bulolo Plantation, NFS_Bulolo, PNG*	Mr. Leonard Wana	
41	Komboi Clyde	*Waste Assessment of the Merchantable Timbers at the Harvested Sites*	Mr. Louis Veisami	
42	Konny Boida	*Effects of Different Nutrient Sources on the Growth and Development of Mushroom Fruiting Bodies Cultivated at the PNG University of Technology in Lae, Papua New Guinea.*	Mr. Billy Bau	
43	Maulininingi Dennis	*Minimizing Risk of Rising Sea Level Through the Planting of Mangroves Along Coastal Areas: A Case Study in Logui Village, Huon Gulf District of Morobe Province, Papua New Guinea*	Mr. Billy Bau	
44	Suruk Joshua	*Possibility of Replanting Teak Rootstocks on Logged Over Areas in Abau District Central Province*	Mr. Eko Maiguo	

Research Collaborations

The School of Forestry has been actively engaged in various research projects. In previous years, the school has partnered with external organizations, including the Australian Center for International Agricultural Research (ACIAR) Alumni Research Support Facility (ARSF), led by Associate Professor Cossey Yosi. This collaboration resulted in a research grant for their joint project, detailed in next Table.

To further promote research collaboration, the school entered a Memorandum of Understanding (MoU) with CIFOR-ICRAF in 2023 to collaborate on research and capacity development. This partnership led to a scholarship awarded to one of our MPhil students in 2024. Additionally, the School collaborates with various national research partners on different projects, including the PNG Forest Authority (PNGFA), the Forest Research Institute (FRI), Santos (formerly PNG Biomass Ltd), TotalEnergies-PNG, and the Binatang Research Center (BRC).

The following table provides an overview of research projects and collaborations in 2024, including the research topic, institutions involved, funding sources, and current status. These projects covered various topics and involved partnerships between universities, government agencies, and private sector organizations, highlighting the importance of interdisciplinary collaboration in scientific research.

Research Project Title	**Specific Research Topic / Principal Investigator**	**Collaborating Partners**	**Funder / Sponsor**	**2024 Status**
1. Sustainable Levels of Timber Harvesting in PNG	*Estimating Exploitation Factors associated with Annual Allowable Cut (AAC) in Timber Concessions in PNG* Dr. Cossey Yosi (PI)	Professor Rodney Keenan, University of Melbourne, Australia	ACIAR Alumni Research Support Facility (ARSF)	The first component was completed. The final report was submitted to ACIAR in 2022, and the manuscript is in preparation. The PSR&IC supported the second component, and the study is ongoing**.**
2. Butterfly-host plant distributions and interactions	*Assessing the Distribution and Ecological Interactions of the Queen Alexandrae Birdwing Butterfly (QABB) and Aristolochia host plants*	CIFOR-ICRAF	This MPhil project is in its early stages, and CIFOR-ICRAF and PNGUoT	Research Project Planning began in 2023. The first phase was scheduled to start in 2024; however, work was

	along an Elevational Gradient in Papua New Guinea Ms. Christine Pokana and Dr. Jimmy Moses		will support funding.	delayed until early 2025 due to funding release issues.
3. Upgrading the L.J. Brass Memorial Herbarium of the Forestry Department at the Papua New Guinea University of Technology	*A Plant Taxonomic Study on the Genus Cinnamomum (Lauraceae) in the Papuasia Region: Type Locality Site # 1 Botanical Survey* Mr. Billy Bau (PI)	None.	International Association of Plant Taxonomy (IAPT)	The field survey was completed, and some sterile samples were brought to the herbarium due to the phenological effects of the tree species in northern New Britain.
4. Revision of the genus *Goniothalamus* (Annonaceae) in New Guinea	Plant Taxonomy: An initial herbarium catalog of specimens with a draft manuscript was shared with the specimens' catalog at the Lae herbarium (PNGFRI). Mr Billy Bau (PI)	Dr. Zacky Ezedin Postdoctoral Fellow Harvard University Herbaria 22 Divinity Ave Cambridge, MA	Harvard University grant to Dr Zacky Ezedin	A draft manuscript of the revision was circulated with the Lae specimen photographs. Most photographs of specimens are shared online for comparison—research is in progress.
5. Systematics and phylogeny of *Cinnamomum* (Lauraceae) in Papuasia	Plant Taxonomy: A research proposal has been developed as part of a doctoral application for IPB University and Unitech to collaborate on. IPB University acceptance received for study to commence in August 2025 to 2028. Mr. Billy Bau (PI)	Dr. Deby Arifiani, Herbarium Bogoriense, Research Center for Biosystematics and Evolution, BRIN, Indonesia; Professor Yusuf Sudo Hadi, SoF; Professor Tatik Chikmawati, Plant Biosystematics and Plant Taxonomy, Department of Biology, IPB University, Bogor, Indonesia.	- The application for field research funds was submitted to EUFCCB	The research proposal is anticipated to be presented to the Faculty of Natural Resources for comments. The expected time will be confirmed during the combined school meeting at the end of semester 1, 2025.

Publications

In 2024, the School of Forestry published two papers in high-impact factor journals. It is commendable that the SoF published these articles in international, high-impact factor journals, demonstrating the school's commitment to advancing knowledge in its field of expertise.

Journal Articles

Hermawan, D., Mubarok, M., Abdillah, I. B., Hadi, Y. S., Yosi, C., Chotikhun, A., Pari, R., & Pari, G. (2024). Resistance of polystyrene-impregnated glued laminated lumbers after exposure to subterranean termites in a field. *Journal of the Korean Wood Science and Technology, 52*(1), 70–86. https://doi.org/10.5658/wood.2024.52.1.70

Mubarok, M., Hadi, Y. S., Hermawan, D., Arrasuli, M. H., Ramadhan, V. A., Lubis, M. A. R., & Militz, H. (2024). Adhesion performance of furfurylated plywood bonded with polyurethane and epoxy adhesives. *Journal of Adhesion Science and Technology*, *39*(7), 1–22. https://doi.org/10.1080/01694243.2024.2433692

Book Chapter

Gusamo, B.K. (2024). Importance of *Araucariaceae* for plantation development in Papua New Guinea. In T. Fidalgo Fonseca & A. Cristina Gonçalves (Eds.), *Conifers – From Seed to Sustainable Stands* (Chap. 2). Intech Open. https://doi.org/10.5772/intechopen.1000446

Conference Presentation

Bau, B. (Presenter). (2024, November 15–16). *A new ethnobotanical record of an endemic species of* Cinnamomum *(Lauraceae) on New Britain Island in Papua New Guinea* [Conference presentation]. International Conference on Plant Taxonomy: Tracking Changes Over Time for Biodiversity Conservation and Human Welfare, Indonesian Association of Plant Taxonomy (PTTI).

Seminars – School of Forestry (SoF), PNG University of Technology

Tanga, Z. (2024, March 5). *Current trends in the forestry sector in New Zealand (1 Billion Tree Project) and industry exposure*. School of Forestry, PNG University of Technology.

Pokana, C. (2024, March 26). *Elevational impact on ecological interactions between Queen Alexandra's birdwing butterfly and Aristolochia host plants in Managalas Conservation Area, Oro Province, Papua New Guinea*. SoF Seminar Series, PNG University of Technology. Supervisors: J. Moses & J. Ramni.

Moses, J. (2024, March 26). *Exploring the dynamic relationship between secondary succession, elevation, and ant diversity in Papua New Guinea's rainforests*. SoF Seminar Series, PNG University of Technology.

Penu, I. (2024, July 10). *Species diversity and above-ground carbon stock assessment of mangrove forest in Aluki, Morobe Province, Papua New Guinea* [Seminar]. SoF Seminar Series, PNG University of Technology.

Ouyoumb, P. T. (2024, August 14). *A comparative analysis of different silvicultural treatments over 16 years on forest recovery and tree species regeneration in a selectively logged lower montane rainforest in Papua New Guinea* [Seminar]. SoF Seminar Series, PNG University of Technology.

Wagaia, H. (2024, October 1). *The effect of a 20-year El Niño extreme on the dynamics of lowland tropical rainforest in Papua New Guinea* [Seminar]. PNGUoT Postgraduate Seminar, Papua New Guinea University of Technology.

Menin, P. (2024, October 2). *Assessing the socio-economic impact of forestry pine plantations on local communities: A case study of the Manki Clan in Papua New Guinea* [Seminar]. PNGUoT Postgraduate Seminar, Papua New Guinea University of Technology.

Workshops on Statistical Data Analysis

Maiguo, E., Menin, P., Gebia, O., Baput, B., Vesami, L., Sosanika, G., Hansutan, L., Lomutopa, I., & Gwaso, N. (Participants). (2024). *Introduction to statistical data analysis using R* [Workshop]. Statistical Data Analysis Workshop Using R, BUC. Role: Participants.

Penu, I., & Wafewa, J. (2024). *Introduction to data analysis in agriculture using R* [Workshop]. School of Forestry, PNG University of Technology. Role: Participants.

Future Perspectives for the School of Forestry: Overcoming Challenges and Advancing Excellence

Infrastructure Enhancement for World-Class Research

The School of Forestry (Taraka, Bumbu, and Bulolo campuses) at PNGUoT is committed to conducting world-class research. It recognizes the crucial role that infrastructure plays in this pursuit. We understand that having

adequate transportation, particularly four-wheel-drive vehicles, is vital for successful fieldwork and consultations with forest owners. However, the limited availability of such vehicles poses a significant challenge to effectively coordinating fieldwork activities. To address this obstacle, it is imperative to strategically invest in expanding our vehicle resources, enabling seamless fieldwork operations in even the most challenging terrains. Furthermore, securing suitable project sites in remote areas is essential to ensure comprehensive data collection and experimentation. Therefore, we will focus on enhancing logistical support for fieldwork and improving access to remote locations, which are crucial steps in elevating the SoF's research endeavors to new heights.

Strengthening Supervision of Research Projects

Ensuring efficient supervision of final-year research projects is essential to academic development. The SoF recognizes the difficulties in organizing field trips and consultations and ensuring student involvement. In response, the SoF is formulating a comprehensive policy framework to tackle these concerns, providing valuable guidance for faculty and students in their research pursuits. Through prioritizing mentorship and ethical research principles, the SoF is dedicated to fostering a productive atmosphere for producing exceptional research results.

Incentivizing Research Excellence

At PNGUoT, the current performance measurement system heavily emphasizes job promotions. Still, there is a pressing need to encourage research excellence more dynamically. By implementing incentives for exceptional publications, such as bonuses for those published in prestigious journals, faculty members can be inspired to produce influential research. This forward-thinking strategy not only cultivates a rigorous research culture but also elevates the university's international academic reputation by linking tangible rewards to academic accomplishments.

Benchmarking and Accreditation

The SoF must ensure quality and competitiveness by aligning itself with international standards and seeking accreditation for its facilities and academic programs. Engaging in accreditation processes recognized by relevant accrediting bodies will demonstrate the SoF's commitment to excellence and adherence to industry best practices. Additionally, comparing itself to similar institutions will yield valuable insights for continuous improvement and strategic planning.

The SoF should measure itself against global benchmarks while pursuing accreditation to maintain high standards and remain competitive. The school began a benchmarking exercise in 2024, culminating in a comprehensive report detailing which model university to use for comparison. Given their similar curriculum structure, the SoF is partnering with the University of Canterbury's School of Forestry in New Zealand. Communication has been established, and progress is underway to meet the benchmarking requirements. This collaboration will pave the way for the critical next phase: obtaining accreditation for SoF undergraduate programs to meet international standards.

The School of Forestry (Taraka, Bumbu, and Bulolo campuses) at PNGUoT is well-equipped to tackle challenges and excel in forestry research and education. By strategically investing in essential resources, promoting fairness in resource distribution, closely supervising research programs, and actively encouraging research excellence, the School of Forestry can enhance its global academic reputation and make significant contributions to the fields of forestry, ecology, wood technology, environmental sustainability, and conservation in Papua New Guinea and beyond. Additionally, by benchmarking against established international standards and seeking accreditation, the SoF can reinforce its commitment to excellence and innovation, positioning itself as a leading institution within the ever-evolving academic landscape.

FACULTY OF SCIENCES

SCHOOL OF APPLIED PHYSICS

Head of School: Dr. David Kolkoma

The School of Applied Physics is relatively small compared to other schools, but it serves a large number of students, much like other service departments. Previously, the department offered two programs: the Bachelor of Science in Applied Physics with Electronics and Instrumentation (BSAP) and the Bachelor of Science in Radiation Therapy (BSRT). However, the BSRT program has been temporarily suspended pending further guidance from the Health Department on the projected need for graduates in the coming years. While the BSAP program continues to run, the School of Applied Physics also provides service courses to 10 of the 13 schools within the university. In 2020, the Bachelor of Engineering in Biomedical Engineering (BEBE) program was introduced with an initial cohort of 15 students. As of 2024, the program's second cohort has reached their final year, with 12 of the original 16 students continuing through to the fourth year.

The Bachelor of Science in Applied Physics with Electronics and Instrumentation emphasizes the practical application of physics principles. Students graduate with strong analytical skills and a solid foundation in applied physics. Graduates of the program are employed across the country and overseas in a wide range of physics-related fields, particularly in electronics and instrumentation. They work in sectors such as telecommunications, the airline industry, education, tertiary institutions, mining, PNG Power, and manufacturing—particularly in process control and instrumentation. Many alumni have gone on to establish private consultancy businesses, leveraging their expertise to create job opportunities and industrial training pathways for current students. Feedback from employers and industry stakeholders regarding the performance of our graduates has been consistently positive and encouraging.

Graduates of the new Biomedical Engineering program are expected to find employment within the Health Department. Upon graduation, they will be deployed to general hospitals across the country. Their primary role is to specialize in the operation, maintenance, and management of medical equipment. Ensuring that hospital equipment is functioning optimally is essential for accurate diagnosis, effective treatment, and continuous monitoring of patients under medical care.

The School of Applied Physics offers five postgraduate programs: the research-based Doctor of Philosophy (PhD) and Master of Philosophy (MPhil); and course-based programs including the Master of Science (MSc) in Electronics and Instrumentation, the Master of Technology (MTech) in Exploration Geophysics, and the newly introduced Master of Science in Climate Change and Renewable Energy Access. There is growing interest among students in the School's postgraduate programs. In 2024, one student will graduate with a PhD—an historic milestone for the School, as she will be the first female to earn a doctorate from the department. Additionally, one student will graduate with an MSc in Applied Physics with Electronics and Instrumentation.

Several postgraduate students are currently enrolled in their first year in 2024, including two PhD candidates who are also staff members. The School remains committed to strengthening its postgraduate programs and research efforts, supported by the recent appointment of a School's Research Coordinator.

Research Areas of the Academic Staff

No.	Name of the Academic Staff	Area of Research
1	Prof. Manoj Mukhopadhyay	Applied Geophysics: Geophysical Modeling, Earthquake Seismology, Crustal Geophysics
2.	Prof. Felix Pereira	Astrophysics, Atmospheric Physics, Radiation Physics and Electronics
3.	Prof. Panakal John Jojo	Nuclear and Radiation Physics, Environmental Physics
4.	A/Prof Dapsy Olatona	Energy and Spectroscopy

5.	A/Prof.Velusamy Senthilkumar	Energy Nanomaterials, 2-D Materials, Solar Cells and Oxide Resistive Memories
6.	Dr. Gabriel Anduwan	Energy applications, Geophysics, Nanotechnology, Environmental Physics, Physics Education, Condense Matter and other Applications of Physics Using Microcontrollers and Electronics
7.	Dr. Ali Mohamad	Applied Geophysics in Oil, Gas, and Minerals
8.	Mr. Suame Ampana	Applied Geophysics and Non-Destructive Test (NDT)
9.	Dr. David Kolkoma	Medical Physics, Radiation Physics
10	Mr. Michael Gaoma	Education
11.	Mr. Sylvester Tyrones	Microcontrollers and Microprocessor Applications
12.	Mr. Kenson Tonny	Microcontroller Based Projects, Smart Hybrid Renewable Energy Systems, Data Acquisitions and Smart Monitoring Mechanisms for Renewable Energy Systems and Aircraft Tracking Systems in PNG.

Journal Articles

Ali, M. (2024.). Borehole image log interpretation in fractured basement of Contai Area, Bengal Basin, India for hydrocarbon exploration. *Interdisciplinary Journal of Papua New Guinea of Technology, 1*(1), 43-53.

Mogren, S., Mukhopadhyay, M., Mukhopadhyay, B., Varghese, S., & Ibrahim, E. (2024). Crustal rheological properties provide evidence for large-scale heterogeneity in the extended Arabian Shield crust at the Red Sea margin. *Acta Geophysica, 72*(5), 212–230. https://doi.org/10.1007/s11600-024-01437-w

Mukhopadhyay, M., Mukhopadhyay, B., Mogren, S., & Ibrahim, E. (2025). Rheological evidence for a probable rarefied crust and fracture characterization under northern Harrat Rahat, SW Saudi Arabia: Its significance for geothermal prospects. *London Journal of Research in Science: Natural & Formal, 25*(2), 48–62.

Osora, H., Kolkoma, D., Anduwan, G., Jebakumar Immanuel Edison, T. N., Chandrasekaran, S., Waimbo, M., & Velusamy, S. (2024). Fabrication and electrochemical characterization of an aqueous electrolyte-based Mn_2O_3/rGO//WO_3 asymmetric supercapacitor device. *Emergent Materials, 21*, 886. https://doi.org/10.1007/s42247-024-00886-9

Pereira, F., Panakal, J. J., Banta, S., Ifu, S., & Kolkoma, D. (2024). Evidence of radon emission associated with the 7th October 2023 earthquake off the coast of Madang in Papua New Guinea. *Interdisciplinary Journal of Papua New Guinea of Technology, 1*(1), 37–42.

Pereira, F., Panakal, J. J., Banta, S., & Kolkoma, D. (2024). Radiation dosimetry and their effects on humans in the UNITECH campus. *Interdisciplinary Journal of Papua New Guinea of Technology, 1*(1), 54–59.

Thankachan, T. N., James, N. R., Panakal, J. J., & Bijini, B. R. (2025). Development, characterization, and radiation dosimetry evaluation of bovine gelatin crosslinked with gum arabic aldehyde as brain phantom gel material in radiation therapy. *Radiation Physics and Chemistry, 229*, 112416. https://doi.org/10.1016/j.radphyschem.2024.112416

Conference Presentations

Dopaim, M., & Pereira, F. B. (2024, July 1–4). *Investigation of Climate Variability in different Regions of Papua New Guinea Related to Global Warming and El Niño-La Niña effects*. Paper presented at the 7th National

Research Science and Technology Conference, Papua New Guinea University of Technology, Lae, Papua New Guinea.

John, J. P., Kolkoma, D., & Pereira, F. B. (2024, September 2–6). *Spikes of atmospheric radon levels in relation to seismicity in Lae, PNG*. Paper presented at the South Pacific Environmental Radioactivity Association Conference (SPERA-2024) and International Union of Radioecology (IUR) Workshop, Melbourne, Australia.

John, J. P., Kolkoma, D., & Pereira, F. B. (2024, October 24). *Radon research in Papua New Guinea*. Paper presented at the Asia Oceanic Radon Association (AORA) & Australasian Radiation Protection Society (ARPS) Radon Symposium, Australia.

John, J. P. (2024, October 28–30). *Living with radiation: A Comparative Health Impact Evaluation in High Background Radiation Areas in India With Normal Regions in PNG* (Invited talk). Presented at the 11th International Conference on High Level Environmental Radiation Areas (ICHLERA-11), Sunway University, Kuala Lumpur, Malaysia.

Kilanda, J., Kolkoma, D., & John, J. P. (2024, July 1–4). *Biomedical instrumentation and engineering in PNG – A fact-finding audit*. Paper presented at the 7th National Science and Technology Conference, Papua New Guinea University of Technology, Lae, Papua New Guinea.

Kolkoma, D., & Panakal, J. J. (2024, July 1–4). *Nuclear medicine as a means of health care*. Paper presented at the 7th National Science and Technology Conference, Papua New Guinea University of Technology, Lae, Papua New Guinea.

Sakarias, L., Kolkoma, D., Pereira, F. B., & Panakal, J. J. (2024, July 1–4). *Primordial radionuclides in soil and the radiological parameters*. Paper presented at the 7th National Science and Technology Conference, Papua New Guinea University of Technology, Lae, Papua New Guinea.

Postgraduate Projects

Student	Research Project	Supervisor(s)	Program/Year
Helen Osora Herivi	*Synthesis and Characterization of Metal Oxide with Graphene Nanostructures for Pseudocapacitor Electrode Applications*	*Associate Prfoessor Dr Velusamy Senthilkumar*	PhD Completed
Michael Gaoma	*Cultural Intelligence and Transitional Physics Education in Papua New Guinea*	Professor Felix Pereira	PhD/4 Ongoing
Gideon Aiyowa	*Geophysical Survey of the Ramu-Markham Fault Zone and the Raised Coral Terraces, Eastern Papua New Guinea*	Professor Manoj Mukhopadhyay	PhD/ Ongoing
Leeroy Sakarias	*Presence of Radioactive and Heavy Metal Elements in Underground Drinking Water and Soil in Morobe Province: Estimation of Their Health Impacts*	Prof. Panakal Jojo Dr David Kolkoma	M.Phil/ Completed but on suspension.
Wellington Melpa	*Wireless Automated Fluid Flow Control Device*	Professor Felix Pereira	Completed
Samson Genewa	*Geothermal Reservoir and Its Resources in Papua New Guinea*	Dr Mohammad Ali	M.Tech/ Completed but on Suspension.

Undergraduate Project Titles

1. *Geothermal Resources in PNG & Geophysical Exploration*
2. *Formation Evaluation of Hydro-Carbon Reservoir*
3. *Microcontroller Based Line Follower Robot for Industries*
4. *Microcontroller Based Solar Tracking System*
5. *Design and Development of a Smart Metering System for Electricity Theft Detection*
6. *Hybrid Coffee/Cocoa Drier, Solar Generated Electricity and Firewood- Heat*
7. *Familiarization with J-K Flip-Flop Counter Circuit*
8. *Investigating Gender Specific LVAD Designs Based on Anatomical And Physiological Differences for Optimal Patient Outcomes*
9. *Simulation and Evaluation of Organs - on - Chip Systems*
10. *Bio Mimetic Robotics Inspired by Prehistorical Beasts: Numerical Analysis and Design Exploration*
11. *Medical Applications of Radioisotopes*
12. *Baby Monitoring Systems Using Wireless Sensor Networks for Hospitals*
13. *Optimizing Fibre Optic Sensor Systems for Aircraft Structural Health and Monitoring Integration with Aircraft Systems*
14. *Nanoparticle-Based Targeted Drug Delivery*
15. *Evaluating the Feasibility of Non-Invasive Malaria Diagnostic Method*
16. *Kidney Supporting Systems*
17. *Determination of Refractive Indices of Liquids Using Optical Fibres*
18. *Portable ECG Machine with Remote Monitoring*
19. *Application of LASER on Biomedical Field Jeftha Tumal*
20. *ECG & Heart Monitoring System (Arduino) Richard Winuan*
21. *Smart Security System for Houses, Dormitories and Departments in Unitech*
22. *Portable Nano Hydro Power Generator with Automated System Control Using Microcontroller for a DC/AC Rural House*
23. *Timetable and Announcement Management System for Applied Physics*
24. *Implementing a Smart Data Logger for Monitoring Energy Consumption from Renewable Resources*
25. *Development of a Machine Learning Model for Mineral Classification Using Hyperspectral Imaging*

SCHOOL OF APPLIED SCIENCES

Head of School: Dr. Lydia R-Yalambing

Introduction

The School of Applied Sciences offers two (2) degree programs; Bachelor of Science degree in Food Technology and Bachelor of Science degree in Applied Chemistry. The school also offers Master of Philosophy and Doctor of Philosophy in the named degree programs. A new Master of Science in Applied Chemistry has been approved by the University in 2024 and expected to commence in February 2025. The faculty members in Food Technology discipline are currently designing a Master of Science course in the Food Science & Technology area.

Our Vision**:** "To become a school that produces intellectual manpower for Papua New Guinea's development and sustenance".

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

The year 2024 has a been a good year for School of Applied Sciences, in terms of four new international staff joined the school bringing with them their unique expertise, experiences, skills, research areas to boost, and strength research capacity in the school. The focus of most of our community as well as industry partnership research projects remains in translating science and technology (in the areas of Food Technology & Applied Chemistry) into products, technologies and or outcomes that transform the lives of everyday Papua New Guineans.

Broad Research Interest Areas of the School

(a) **Chemistry:** Environment Pollution, Material Science, Water and Organic Chemistry Related Research. Recent Interests in Synthesis, Characterization and Applications of Composite Materials, And Nanotechnology.
(b) **Food Technology:** Food Processing, Post-Harvest Studies and Technologies, Clean Energy, Quality Control and Nutrition Related Research.

Research Interest Areas of Academic Staff

Applied Chemistry Department

No.	Name	Research interests
1	Professor Ananda Murthy	Synthesis, Characterization and Applications of Composite Materials and Nanomaterials for Biomedical, Sensor and Environmental Applications
2	Dr. Srikanth Bathula	Chemical Speciation and Bioavailability, Environmental Studies, Geomorphological Impact Assessment on Groundwater Quality, Coastal Groundwaters–Geo-hydro Chemical Exploration, Photocatalytic Activity and Degradation, Synthesis and Characterization of Nanomaterials, Investigation of Oil Samples at Seawater Sources
3	Dr. Janarthanan Gopalakrishnan	Synthetic Inorganic Chemistry, Inorganic Chemistry in Traditional Practices, Environmental Pollution Studies and Development of Sustainable Solutions, Composite Friction Materials
4	Dr. David Timi	Organic Chemistry, Phytochemistry

5	Mr. Justin Narimbi	Analytical Chemistry, Environmental Chemistry, Instrumental Methods for Analysis, Water Quality Assessment and Monitoring, Laboratory Quality Management
6	Dr. Jason Wau	Green Chemistry and Natural Product Chemistry
7	Mr. Kaupa Philip	Composite Materials

Food Technology Department

No.	Name	Research interests
1	Dr. G. Tolesa	Integrated Postharvest Pre-Storage Treatments and Technologies to Extend the Shelf-Life of Fresh Produces (Fruit, Vegetables, Tubers, Root Crops, Spices and Cash Crops), Agro-Food Processing and the Value-Additions of Food Materials Cooling, Drying, and Packaging Research [Heat and Mass Transfer, Fluid Flow (CFD), Kinetics, Modelling in Food Materials and Processing], Computer-Aided Design and Food Process Optimization in Agro-Food Processing and Engineering, Postharvest Technology Transfer in Agro-Food Value Chain
2	Dr. S. Palaniappan	Assessment of Mycotoxin Contamination in PNG's Export Commodities; Producing Biogas from Fish Industry Waste, Lactic Acid Fermentation of Local Root Crops
3	Mr. R. Nigo	Renewable and Clean Energy, Animal Feed Development, Thermal Processing, Food Drying Studies Using Solar and Clean Energy Systems, Food Product Development Processes
4	Dr. L. Yalambing	Food Composition studies, Nutrition sensitive agriculture, Nutrition Intervention Studies, Complementary/Supplementary Food Development
5	Mrs. S. Denano	Food Safety and Food Security, Compliance Studies
6	Mr. N. Kiaka	Industrial Solid and Liquid Waste Management
7	Mrs. R.G. Sipou	Food Microbiology, Microbial Quality of Food and Water, Medicinal Studies of Indigenous Plants

Journal Articles Published

Abebe, B., Kefale, B., Amenu, G., Guta, L., Ravikumar, C. R., Hamdalla, T. A., Reddy, S. G., Tsegaye, D., & Ananda Murthy, H. C. (2024). Cobalt-doped ZnO nanocomposites for efficient dye degradation: Charge transfer. *ChemistryOpen, 13*, e202400203. https://doi.org/10.1002/open.202400203

Ahamed, N. N., Pattar, M. R. J., Kumar, N. A., Basavaraju, N., Raghavendra, N., Sharanakumar, T. M., Ravikumar, C. R., & Ananda Murthy, H. C. (2024). Electro-chemical studies of Zn-doped nickel oxide nanoparticles synthesized via solution combustion method using green and chemical fuels. *RSC Advances, 14*, 17664–17674. https://doi.org/10.1039/d4ra01706d

Ajay, K., Dinesh, M., Dhanalakshmi, M., Somashekar, M., Ravikumar, C., & Ananda Murthy, H. C. (2024). Supercapacitor and photocatalytic applications of hydrothermally synthesized polydymite nanoparticles. *Asian Journal of Chemistry, 36*(10), 2368–2374. https://doi.org/10.14233/ajchem.2024.32401

Asha, S. C., Divakara, S. G., Mahesh, B., Ravikumar, C. R., & Ananda Murthy, H. C. (2024). Improved photocatalytic activity triggered by UV light, as well as electrochemical sensing characteristics of MgO nanoparticles. *International Journal of Environmental Analytical Chemistry*, 1–20. https://doi.org/10.1080/03067319.2024.2415528

Asha, S. C., Mahesh, B., Ravikumar, C. R., Chamaraja, N. A., & Ananda Murthy, H. C. (2024). Green synthesis of calcium oxide nanoparticles using *Ocimum sanctum* leaf extracts: Photocatalytic and electrochemical

sensor applications. *Journal of Materials Science: Materials in Electronics, 35*, 1738. https://doi.org/10.1007/s10854-024-13374-x

Basavaraju, N., Raghavendra, N., Hamdalla, T. A., Ravikumar, C., Nagaswarupa, H., Shekhar, T. S., Surendra, B., & Ananda Murthy, H. C. (2024). A novel synthesis of $ZnNb_2O_6$ nanoparticles via combustion method: Supercapacitor and photocatalytic properties. *Particles and Particle Systems Characterization, 41*, 2400061. https://doi.org/10.1002/ppsc.202400061

Bekele, E. T., Ambecha, F. D., Ravikumar, C. R., Ananda Murthy, H. C., & Duke, D. N. (2024). *Foeniculum vulgare* leaf extract loaded synthesis of silver nanoparticles in different volume ratios for antimicrobial and antioxidant activities: Comparative study of composition. *Journal of Sol-Gel Science and Technology, 112*, 112–126. https://doi.org/10.1007/s10971-024-06476-9

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Conference Presentations

Arcot, J., & Yalambing, L. (2024, November 5–8). Evidence-based nutrient-sensitive agriculture and fortification to tackle malnutrition in children: Innovative approaches to scaling up/translating solutions for better nutrition and overall well-being of populations—addressing SDGs 1, 2, 3, 10, and 17. Paper presented at the 2024 Pacific SIDS Solutions Forum, Nadi, Fiji.

Janarthanan, G. (2024, July 1–4). Perspectives on developing green composite friction materials as a sustainable, safe, and eco-friendly pathway for automotive applications. Paper presented at the 7th PNG National Conference on Science and Technology, Papua New Guinea University of Technology, Lae, Papua New Guinea.

Postgraduate Student Research

No.	Student	Degree	Topic	Principle Supervisor
1	Justin Narimbi	PhD	*Synthesis and Applications of Novel Zeolite Imidazolate Framework (ZIF) Hybrid Materials*	Dr. S. Balakrishnan
2	Sogoing Denano	PhD	*Ecological Risk Assessment of Selected Rivers in Papua New Guinea: A Case Study in Relation to Heavy Metals Contamination, Severity of Sediment Perturbation, and Food Safety*	Dr. Timi & Professor Okpul
3	Kaupa Philip	PhD	*Synthesis of Rare Earth Metal Doped ZnO Supported on S-Doped Graphitic Carbon Nitride (G-C_3N_4) for Applications in Adsorption, Photodegradation, and Sensing of Environmental Pollutants*	Professor Ananda Murthy
4	Nigel Kiaka	MPhil	*Designing a Suitable Drying System for Higher Altitude Conditions: Using Gembolg District, Chimbu Province as a Model*	Mr Reilly Nigo
5	Salvina Ku	MPhil	*Analytical Capillary Electrophoresis for Environmental Applications in Papua New Guinea*	Dr. Timi
6	Ruthia Kisi	MPhil	*Quality Evaluation of Selected Commodity Products from PNG Using ICP-OES & Capillary Electrophoresis*	Dr. S Balakrishnan
7	Esther D. Tuweyo	MPhil	*The Determination of Optimum Methane Generation from the Co-Digestion Coffee Pulp and Treated Chicken Manure – A BMP Analysis*	Dr S. Bathula
8	Stephanie Anis	MPhil	*Chemical and Biological Activities of the Five (5) Plant Species of Xanthostemon (Myrtaceae) Found in PNG*	Dr. D. Timi

Undergraduate (Final Year Students) Research Projects

Applied Chemistry Department

No.	Student Name	Supervisor	Topic
1	Anis Jannice	Mr. J. Narimbi	*Antimicrobial Studies of Silver Nanoparticle Loaded Metal-Organic Framework (AgNPs@MOF)*
2	Bapun Fredrick	Mr. J. Narimbi	*Adsorption Studies of Single-Metal and Bimetallic MOFs*
3	Wilson Amenda	Mr. J. Narimbi	*Antimicrobial Studies of Single-Metal and Bimetallic MOFs*
4	Apis Lemuel	Mr. J. Wau	*Evaluation of Sensitizers in Aiding for the Degradation of Polystyrene*
5	Bailey Edith	Mr. J. Wau	*A Closer Look at Histamine Forms Pre–HPLC*
6	Barry Jady	Dr. H. Kemung	*Red Seaweed Product Development and Determination of Mineral Salts Content Therein*
7	Igunga Roberta	Asso/Prof. Janarthanan	*Estimation of Microplastics in Commercially Available Personal Care and Cosmetic Products in Lae*
8	Iparam Jamilah	Asso/Prof. Janarthanan	*Development of Biodegradable Films from Local Cultivars of Banana*
9	Kalyo Lyandi	Dr. D. Timi	*Anti-diabetic Assessment of Custard Apple & Soursop*
10	Kenori Alfred	Asso/Prof. Janarthanan	*Phytochemical Properties, Bio-silica Synthesis and Salt Extraction Studies on Various Species of Bamboo Available in Papua New Guinea*
11	Maika Heavenly	Asso/Prof. Bathula	*Qualitative Analysis of Lubricant Oil for Hydropower Turbines and Generators of PNG Power*
12	Malikes Posing	Prof. A. Murthy	*Green Synthesis of ZnO Nanoparticle using the Aqueous Banana Peel Extract for Antibacterial Application*
13	McNai Shiyanne	Asso/Prof. Janarthanan	*Estimation of Microplastics in Various Waterbodies in Lae*
14	Nawi Wilfred	Mr. Kaupa	*Acid Activated Betelnut Husk for Methylene Blue adsorption: Thermodynamic and Kinetic Studies*
15	Nelson Patrick	Dr. D. Timi	*Synthesis and Anti-bacterial Assessment of Plant-Mediated Biosynthesis of Silver Nanoparticles*
16	Numa Hannah	Prof. A. Murthy	*Green Synthesis of CuO Nanoparticle Using the Aqueous Mango Peel Extract for Antibacterial Application*
17	Philip Brian	Asso/Prof. Bathula	*Quantity of the Presence of Casein in Different Milk Brands Available in PNG*
18	Pora Gabriel	Dr. D. Timi	*Synthesis and Anti-bacterial Assessment of Plant-Mediated Biosynthesis of Silver Nanoparticles*
19	Sheekiot Shayna	Dr. D. Timi	*Anti-diabetic Assessment of Ficus damaropsis*
20	Sindang Floda	Mr. P. Kaupa	*Adsorption of Cd (II) on Areca catechu Husk: Physicochemical Assessment and Mathematical Modelling*
21	Taumaku Taumaku	Asso/Prof. Bathula	*A Study of Biodegradable Polymers and Materials*
22	Tumbin Greg	Mr. P. Kaupa	*Acid-modified Oil Palm Mesocarp Fiber Biochar for Cr(VI) and Pb(II) Removal: Physicochemical Characterization, Isotherm and Kinetic Studies.*
23	Tieng Cassandra	Asso/Prof. Bathula	*A Quality Assessment of Paracetamol Tablets Available in PNG*
24	Ururu Lazarus	Prof. A. Murthy	*Green Synthesis of TiO_2 Nanoparticle Using the Aqueous Papaya Peel Extract for Antibacterial Application*

25	Vele Shimona	Prof. A. Murthy	*Green Synthesis of Co_3O_4 Nanoparticle Using the Aqueous Avocado Peel Extract for Antibacterial Application*
26	Hoxchey Anton	Mr. J. Wau	*Extraction of Ethanol from Vanilla Extracts*

Food Technology Department

No.	Student	Project Tile	Supervisor
1	Paula Ambose	*Further studies on Antimicrobial Resistance of E. coli Extracted from Fresh Meat*	Mrs. R.G. Sipou
2	Koralis Ani	*Anti-microbial Resistance of S. aureus Extracted from Ready to Eat Foods*	Mrs. R.G. Sipou
3	Tapurang Benedict	*Product Development Studies Using Indigenous Bean Protein*	Mr. R. Nigo
4	Jessabell Gene	*Microbial Quality and Antimicrobial Activities of Locally Produced Herbal Products*	Mrs. R.G. Sipou
5	Sheriss Guants	*Further Studies on Chicken Feed Development -Raised Bed*	Mr. R. Nigo
6	Christopher Igidu	*Characterizing Waste Treatment Systems of Fish Processing Plants*	Mr. N. Kiaka
7	Esther Kavale	*Production and Packaging of Dried Plantain*	Dr. G N Tolesa
8	Tania Linge	*Biomass Fuel Studies Using Coffee and Wood Waste*	Mr. R. Nigo
9	Samuella Maino	*Further Studies on Biogas in Buakap Village, Salamua*	Mr. R. Nigo
10	John Mathew	*Product development studies using indigenous bean protein*	Mr. R. Nigo
11	Samol Monalisa	*Effect of Selected Cooking types of Cooking Oil in Frying*	Mr. N. Kiaka
12	Ruby Mopafi	*Assessment of Salt (Sodium) Content of Commonly Consumed Biscuits/Breads, Snack Food Items*	Dr. L.R. Yalambing
13	Annabella Morea	*Microbial Quality of Egg Trays Used for Storage of Cooked Shell Eggs*	Mrs. R.G. Sipou
14	Asher Ehyeh Morito	*Assessment of Post-Prandial Glucose Response of Different Commonly Consumed Foods*	Dr. L.R. Yalambing
15	Melanie Posenu	*Suitable Production Method for Onion Flakes*	Mr. N. Kiaka
16	Jothan Sowang	*Determination Of B-Carotene in Yellow Fleshed Cassava Tubers Sold at the Lae Main Market*	Ms. D. Bau
17	Delitha Sumei	*Studying the Effect of Storage Methods on the Nutrient Content of Specific Varieties of Sweet Potatoes and Cooking Bananas*	Ms. D. Bau
18	Palakini Vele	*Shelf-Life Studies of Cocoa and Coffee-Based Drinks*	Mr. R. Nigo
19	Ayang Waen	*Determining the Physio-Chemical Properties of Plants of Markham River and Its Tributaries*	Mrs. S. Denano
20	Magela Wamala	*Shelf-Life Study of Cassava*	Dr. G.N. Tolesa
21	Gaisine Mua	*Assessment of Food and Nutrition Insecurity in the Local Community; A Case Study Using Questionnaire/Interview of Members of One's Community or one of The Settlements Around Lae*	Dr. L.R. Yalambing

Ongoing Staff Research Projects

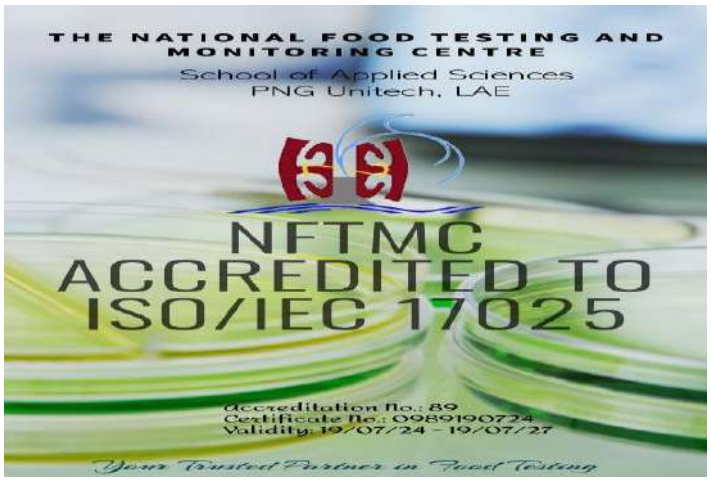
Green synthesis of Silver based multi-metallic nanomaterials mediated by extracts of medicinal plant species of Papua New Guinea for potential antibacterial and sensor applications, PGK 37,768.20 was approved on 1st August 2024 by PSRI&IC of PNGUoT to Prof. Dr. H C Ananda Murthy, Dr. David Timi, and Mr. Philip Kaupa.

Research Projects with External Stakeholders

NFA–PNGUoT: Accreditation of the NFTMC Laboratory

National Food Testing and Monitoring Centre (NFTMC) secured its FULL ACCREDITION on the 19th of July, 2024 and now operating as fully accredited laboratory in the country to empower both local and international trade.

The accreditation of NFTMC elevates our capacity to conduct high quality research, and provides our students and staff in the school and university with access to some of the cutting-edge technologies and methodologies in food analysis and monitoring. This advancement will not only benefit the academic community at the university, but also boost and strengthen the capabilities of the food and agricultural-commodity industries in ensuring that their products meet the stringent requirements of international markets hence increasing trade and thereby the economy of the country.



The logo of the NFTMC reflecting the ISO/IEC17025 accreditation

Collaborating partner in an ongoing research project between the University of New Caledonia, James Cook University Australia and Applied Sciences, PNGUoT. Dr. David Timi

Miss Stephanie Anis (MPhil. Student) based her research study on the chemical and biological investigation of volatile oil of the leaves of species of Genus *Xanthostemon* of family Myrtaceae. The research is one aspect of a PIURN (Pacific Islands University Research Network) project. It was sponsored by the University of New Caledonia and partnered with James Cook University and PNG University of Technology, directing different research components on the species in their respective countries. The primary objective of the study was to explore and identify biomolecules to address current global issue of resistivity of conventional antibiotics and pesticides. From the leaves of *Xanthostemon* species a related group of volatile bioactive chemicals called beta-triketones are said to be present. The student extracted oil from the leaves of three of the four Xanthostemon species reported to occur in PNG and has identified their constituent chemicals. She has further done bioassays on some selected biological systems to validate the bioactivity of these phytochemicals. The findings will be presented in the up-coming PIURN conference mid-year here at PNG University of Technology and possibly published as a written communication at a later date.

Research, Science & Technology Secretariat and PNGUoT School of Applied Sciences, Project entitled: Bioprospecting and Product Development**. Dr. David Timi.**

The project is on searching and identifying beneficial biomolecules via related bioassays techniques from natural biological sources and turning promising ones into products for use as pharmaceuticals, pesticides, cosmetics, nutraceuticals etc. The National Government has approved and will be funding the project for the next 5-10 years through the Department of Research Sciences & Technology from 2024 onwards. Invitation will be extended to the other science departments at PNGUoT for assistance in funding for any research relating to the project title. The project will be hosted by the School of Applied Sciences, PNG University of Technology. Postgraduate students will be recruited and engaged to carry out the research studies.

Design, Construction and Commissioning of SOLAR COMBINATION DRYERS – Partnership with Fresh Produce Development Agency (FPDA) and Kabwum District, Morobe Province - Mr. Reilly Nigo

Projects Under FPDA - Bulb Onion Curing System

This research work started as model student project work is now fully working as a successful model. This model has been adopted by FPDA to assist bulb onion farmers in PNG. The adoption of the innovation is on demand and spreading across the Highlands region. Below are few pictures of the solar dryers in use.

Projects Under Kabwum District Administration, Morobe Province

Coffee Solar Drying System

Applied research work and field trial work on coffee drying started in Tipsit Village in partnership with the Kabwum District Administration, Morobe Province in December, 2022 and its now spreading to other local level governments (Selep LLG, Dayamos LLG and Komba LLG) in the Kabwum District. Apart from the development and installation of solar dryers, farmers have also been assisted in quality control systems, and this has led to production of highest-grade green beans in Morobe Province about 83% as proven by the cupping test done by AGMARK. So far, the project has delivered 13 solar dryers of 800-1000 kg capacity, touching lives of close to 2000 farmers. Below are the photographs of one of these coffee solar dryers under use.

By: Reilly Nigo, Dpt of Applied Sciences,
PNG UOT: Email: reilly.nigo@pnguot.ac.pg

SCHOOL OF MATHEMATICS AND COMPUTER SCIENCE

Head of School: Dr. Mohsen Aghaeiboorkheili

The School of Mathematics and Computer Science at the Papua New Guinea University of Technology is among the largest schools in the institution, consisting of 30 academic staff members and five support personnel. Its primary mission is to produce skilled graduates and conduct high-quality research in the fields of Computer Science and Applied Mathematics. Additionally, the school plays a crucial role in delivering essential Mathematics and Computing service courses to other schools within the university. A key objective of the school is to ensure that its graduates meet rigorous academic standards enabling them to contribute effectively to research, development, and practical applications within Papua New Guinea and across the broader Pacific region.

Situated within the Taraka campus, the school specializes in training professionals in Computer Science, Information Technology, and Applied Mathematics. It offers a four-year undergraduate degree program leading to a Bachelor of Computer Science and a Bachelor of Science in Applied Mathematics (BSAM), a program that was introduced in 2022. Furthermore, the Faculty of Postgraduate Studies, Research and Innovation has approved a Master of Science (MSc) program in Applied Mathematics, which commenced in Semester 1, 2025. This postgraduate program, spanning four semesters, aims to strengthen advanced mathematical research and its practical applications, further enriching the school's academic portfolio and research capabilities.

In response to the rapid advancements in technology and the growing reliance on digital platforms in everyday life, the school remains committed to equipping its graduates with the necessary skills to excel in the evolving landscape of Computer Science and Applied Mathematics. The increasing significance of the Internet and cutting-edge technologies has made access to information instantaneous, further emphasizing the need for graduates who can actively contribute to national and international technological development. The school strives to produce highly skilled professionals who are proficient in designing and developing complex computing systems and who can compete effectively with their peers within Papua New Guinea and throughout the Pacific region.

Education is a fundamental pillar of the university's mission, and the School of Mathematics and Computer Science is dedicated to providing exceptional academic and administrative support services. Its commitment extends beyond undergraduate education to include the continuous expansion of postgraduate programs, which aim to refine the research skills developed during undergraduate studies. A significant aspect of this training is the Year 4 Final Year Research Project, which serves as a foundation for developing research expertise among students.

One of the primary challenges in Mathematics and Computer Science education is to cultivate professionals—both men and women—who possess the technical expertise required to analyze and solve complex problems. To address this challenge, the school places a strong emphasis on developing problem-solving abilities through an integrated approach that combines education with research. Faculty members actively engage in research projects, ensuring that the knowledge gained through academic inquiry is applied to real-world technological challenges. By fostering critical thinking, analytical reasoning, and innovative problem-solving skills, the school ensures that its graduates are not only academically proficient but also well-prepared to tackle practical challenges in various professional domains. This commitment to academic excellence, research integration, and practical application reinforces the school's role in advancing technological and scientific progress both nationally and within the Pacific region.

Priority Research Areas of the MCS School

The School of Mathematics and Computer Science at Papua New Guinea University of Technology has established several key research areas that reflect its commitment to advancing knowledge in mathematics, computing, and their interdisciplinary applications. These priority research domains encompass a broad range of topics, addressing both theoretical and practical challenges in science, engineering, and technology.

1. Numerical Analysis and Scientific Computing

Many real-world problems in science and engineering are too complex to be solved purely through analytical methods. Research in numerical analysis and scientific computing focuses on developing and analyzing numerical

algorithms, implementing these algorithms on modern computing systems, and utilizing numerical methods alongside mathematical modeling to tackle large-scale practical problems. The goal is to create efficient and accurate computational techniques that contribute to problem-solving in diverse scientific fields.
Key research areas include Partial Differential Equations (PDEs), Ordinary Differential Equations (ODEs), Boundary Value Problems, Integral Equations, and Advanced Computational Techniques.

2. Theoretical Mathematics
Theoretical mathematics explores abstract mathematical structures that provide the foundation for numerous disciplines within the mathematical sciences. While much of this research is driven by intellectual curiosity, it also serves as a fundamental building block for future scientific discoveries, often in unexpected ways. The study of algebra and number theory, two of the oldest branches of mathematics, remains central to the field and continues to inspire modern advancements.
Key research areas include Discrete Mathematics, Analysis, Geometry and Topology, Number Theory, Algebra, and Other Foundational Mathematical Structures.

3. Curriculum Management System (CMS)
A Curriculum Management System (CMS) is a digital framework designed to support the entire academic curriculum process, from planning and implementation to assessment. This system provides structured guidelines and procedures that facilitate standards-based teaching and learning. Research in this area focuses on developing efficient methodologies and systems that improve curriculum design, evaluation, and collaboration within educational institutions.
Key research areas include Curriculum Design, Curriculum Mapping, Collaborative Curriculum Development, and Curriculum Publishing.

4. Software Engineering
Software engineering applies engineering principles to software development with the goal of designing, improving, and maintaining software systems. Research in this domain examines both the hardware and software environment necessary for building efficient and scalable programs. It addresses challenges in modern computing, including data management, distributed systems, and emerging computational technologies.
Key research areas include Data Mining, Semantic Web Mining, Distributed Computing, Databases, Distributed Systems, Data Warehousing, Green Computing, Graphical User Interfaces (GUI), and Mobile Computing.

5. Statistical Science
Statistical science aims to present the depth and breadth of contemporary statistical methodologies, making them accessible to researchers, practitioners, and students. This field integrates multiple sub-disciplines and applications, supporting decision-making and analytical processes in various domains, including biostatistics, economics, and operations research.
Key research areas include Statistics and its Subfields (Biostatistics, Biometrics, Econometrics), Operations Research, Management Science, Quantitative Methods, Decision Science, and Analytics. The Application of statistical Techniques Spans Across Numerous Fields of Human Activity, Facilitating Data-Driven Decision-Making.

6. Internet of Things (IoT) and Digital Forensics
As digital devices become increasingly interconnected, cybersecurity threats and digital crimes are growing concerns. Research in IoT and digital forensics focuses on developing techniques for securing networks, analyzing digital evidence, and improving forensic methodologies to track and prosecute cybercriminals. Additionally, IoT research explores how interconnected devices can enhance efficiency across various domains, including smart cities, healthcare, and industrial automation.
Key research areas include The Intersection of IoT, Big Data, Computer Networks, Network Management, Human-Computer Interaction, Computer Organization, Machine Learning, and the Social Sciences.

7. Mathematical Modeling

Mathematical modeling plays a critical role in scientific research, offering a structured approach to representing, analyzing, and solving real-world problems. By transforming real-life scenarios into mathematical formulations, researchers can improve system design, enhance control mechanisms, and optimize computational processes. This field is instrumental in disciplines such as biology, finance, physics, and engineering.

Key research areas include Dynamical Systems, Ordinary And Partial Differential Equations (ODEs and PDEs), Lyapunov Functions, Mathematical Biology, Actuarial Science, Computational Mathematics, Data Science, Operations Research, Stochastic Processes, Numerical Analysis, and Scientific Computations.

Through its diverse and interdisciplinary research initiatives, the School of Mathematics and Computer Science at Papua New Guinea University of Technology is committed to advancing knowledge, fostering innovation, and contributing to the global academic and scientific community. By integrating theoretical foundations with applied research, the school aims to equip students and researchers with the expertise needed to address complex challenges in mathematics, computing, and related fields.

Faculty Members and Research Interests

In 2024, the school of Mathematics & Computer Science have 30 Academic Staff and table below provides breakdown of their research interests.

No	Name	Position	Research Interests
1	Dr. Mohsen Aghaeiboorkheili	Head of School & Senior Lecturer	Numerical Methods, PDE, Boundary Value Problems
2	Mr. Boaz Andrews	Deputy Head of School & Lecturer II	Statistics & Probability, Boolean Algebra, Algebraic Systems applied in Informatics
3	Prof. Hasan Gümral	Head of Mathematics Section & Professor	Geometric Mechanics
4	Dr. Arun Kumar Singh	Head of Computer Science Section & Associate Professor	IoT, Big data, Computer Network, Network Management, Human Computer Interaction, Computer Organization, machine learning and social science
5	Dr. Chris Wilkins	Senior Lecturer	Programming Languages, Statistics, Probability Models
6	Dr. Mansooreh Kazemilari	Senior Lecturer	Topological Network Analysis, Econometrics
7	Mr. John Lanta	Senior Lecturer	Differential Equations, Statistical Modelling, Topological groups and rings
8	Dr. Benson Mirou	Senior Lecturer	Software Engineering, Computer Networks, e-Agriculture
9	Mr. Samuel Dunstan	Lecturer II	Numerical Analysis, Scientific Computing
10	Dr. Rajendran Bhojan	Lecturer II	Big Data mining, Data in Network Intrusion and Bioinformatics
11	Mr. Nicholas Puy	Lecturer II	Image Processing, Machine Learning, Deep Learning, Data Science, Internet of Things (IoT)
12	Mr. Yaling Tapo	Lecturer I	Computer Networks, Data Science

13	Mr. Lenz Nerit	Lecturer I	Software Engineering, Reverse Engineering, Artificial Intelligence
14	Mr. Peter Helebi	Lecturer I	Big Data and Analytics, Machine Learning, Predictive Modelling, Data Science, Artificial Intelligence
15	Mr. Raymond Kuna	Lecturer I	Mathematical Modelling, Differential Equations, Topological groups and rings
16	Mr. Cyril Sarsoruo	Lecturer I	Functional Equations and Inequalities, Mathematical Modeling
17	Ms. Doris Benig	Lecturer I	Statistical Modelling, Probability Methods
18	Mr. Sankwi Abuzo	Lecturer (TI)	Internet Programming, Online Examination Systems
19	Mr. Bobby Angopa	Part Timer	Applied Statistics
20	Mr.Joel Tahie	Part Timer	Discrete Mathematical Structures, Graph Theory, Differential Equations
21	Mr. Issac Angra	Part Timer	Linearization of Nonlinear Systems using Numerical Approximation Techniques, Mathematical Modelling, Differential Equations, Complex Analysis
22	Mr. Luke Kolalio	Part Timer	Cyber Security, Computer Networking, Database, AI
23	Ms. Siporah Tienare	Part Timer	Computer Networks
24	Mr. Alois Wemin	Part Timer	Applied Statistics
25	Mr. Japath Tikil	Part Timer	Applied linear algebra, Numerical methods, Matrix decompositions in pattern recognition
26	Ms. Savithiri Kothumudi Mathan	Part Timer	Numerical method
27	Mr. Raunu Gebo Sarsoruo	Part Timer	Polynomial Ideal Classes, Cryptographic applications of Polynomial Ideal Classes, AI-Based Research in Polynomial Ideal Classes, AI-Driven Security in Cloud-Based IoT
28	Ms. Jean Vava	Part Timer	ODE, PDE
29	Mr.Kialakun Galgal	Part Timer	Engineering Mathematics, Applied Mathematics
30	Ms. Percy Roary	Part Timer	Deep Learning, Digital libraries, ICT applications, AI and data science, IoT, GIS, cybersecurity, and human-computer interaction

Postgraduate Research Projects

In the year 2024, the School of Mathematics and Computer Science at Papua New Guinea University of Technology recorded a total of seven (7) postgraduate research studies being conducted within the institution. These research projects are at various stages of progress, including those currently ongoing, those in the final phase of thesis submission, cases where corrections are being made following review, and candidates who are in

the process of meeting final requirements before graduation.
All of these postgraduate studies are being undertaken by students enrolled within the School of Mathematics and Computer Science at this university, highlighting the school's commitment to advancing research in its specialized fields. Furthermore, these postgraduate research endeavors span multiple academic levels, including PhD, Master of Science (MSc), and Master of Philosophy (MPhil) programs.
Out of the seven (7) postgraduate students engaged in research, four (4) are pursuing their Doctor of Philosophy (PhD) degrees, demonstrating a strong focus on advanced, high-level research within the school. Meanwhile, three (3) students are enrolled in the Master of Philosophy (MPhil) program, further contributing to the school's academic research output and reinforcing its role in developing scholars with expertise in mathematics and computer science.

No	Student Name	Program	Thesis / Research Topic	Principal Supervisor	Status
1	Benson Mirou	PhD/6	*Development of e-Crop Disease App for Farmers in Papua New Guinea*	Prof. Macquin Maino	Study in progress
2	John Lanta	PhD/3	*Bohr Compactification of Alternative and Jordan Rings*	Prof. Mihail Ursul	Study in progress
3	Peter Helebi	PhD/2	*Big Data Analytics and Data Science for Socioeconomic Development in PNG*	Prof. Dr. Zhaohao Sun (School of Business Studies)	Study in progress
4	Boaz Andrews	PhD/1	*Boolean Algebra*	Prof. Mihail Ursul	Study in progress
5	Sankwi Abuzo	MPhil/2	*Designing a Suitable Online Examinations System with Proctoring for the PNG University of Technology*	Dr. Arun Kumar Singh	Study in progress
6	Vincent Mbuge	Mphil/2	*Simulation of Queuing Models in Bank or ATMs with BSP*	Dr. Arun Kumar Singh	Study in progress
7	Japath Tikil	MPhil/2	*The Proper Orthogonal Decomposition and a Novel Application of It*	Dr. Samuel Dunstan	Study in progress

UNDERGRADUATE RESEARCH PROJECTS

No	Student Name	Title	Principal Supervisor
1	Elizah Laki	*TENANCYGUARD Smart Lock App*	Dr. Arun Kumar Singh
2	Nigel Kraip	*Online Educational Resource Platform*	Dr. Arun Kumar Singh
3	Sonya Linny	*Design and Implementation of an Electronic Health Record & Management System for PNGUoT Clinic*	Dr. Arun Kumar Singh
4	Rainier Nii	*Dynamic Image Segmentation Algorithm Adapting to Contrast and Illumination Changes*	Dr. Arun Kumar Singh

5	Lionel Kapus	*Digital Civil Identity Registration Portal in PNG*	Dr. Rajendran Bhojan
6	Patrick Lowfan	*Student Management System - DODL*	Dr. Rajendran Bhojan
7	Freeman Nagau	*Online Notes Sharing System*	Dr. Rajendran Bhojan
8	Waiwen Yanda	*Implementing a Betting Management System for Local Bookmakers in Papua New Guinea*	Dr. Rajendran Bhojan
9	Jordan Puk	*Online Stationery Store (About UNITECH book shop)*	Dr. Chris Wilkins
10	Jamuel Puringi	*Virtual Walk around (VR) of MCS School Building*	Dr. Chris Wilkins
11	Jyammillah Quiocho	*Unitech Student Information Verification Portal*	Dr. Chris Wilkins
12	Tobias Urangenge	*Secure Armory System for PNG Defense Force-Using Facial Recognition Technology*	Dr. Chris Wilkins
13	Euleily Vulupindi	*Development of a Small-Scale Resource Management System*	Mr. Benson Mirou
14	Yame Wange	*Dental Clinic Patient Management System*	Mr. Benson Mirou
15	Kelvin Wariupa	*Enhancing Unitech Timetable Scheduling: An Algorithmic Approach*	Mr. Benson Mirou
16	Jacquelyn Yapenare	*Purchase Order Tracking System for MCS Operations*	Mr. Peter Helebi
17	Elizah Barr	*Inventory Tracking System for MCS Operations*	Mr. Peter Helebi
18	Wera Dawa	*Text Classification Using Machine Learning*	Mr. Peter Helebi
19	Kennioth Sausawagen	*AI-Assisted Legal Consultation System*	Mr. Peter Helebi
20	Richard Konafo	*Software Platform for Enhancing Market Access for Farmers and Farm Productivity with Integrated Crop Disease Detection and Data Insights*	Mr. Lenz Nerit
21	Aru Jonathan	*Malaria Detection System Using CNN Models for Low-Resource Environments In Papua New Guinea*	Mr. Lenz Nerit
22	Leon Bala	*Design And Implementation of An Online Application Submission and Registration System for the School Fee Assistance Scheme in Mul Baiyer Lumusa District.*	Mr. Lenz Nerit
23	Lucy-Esther Benjamin	*Online UOT Accounts Management System*	Mr. Lenz Nerit
24	Michael Moutu	*Enhancing Typing Proficiency: Effectiveness, User Experience, and Educational Impact of Typing Skills Software*	Mr. Yaling Tapo
25	Siem Sepi	*Heart Disease Detection System Using Python and Machine Learning*	Mr. Yaling Tapo

26	Christina Yagi	*Syndromic Surveillance System for Malaria*	Mr. Yaling Tapo
27	Faithmarie Mita	*Automated Teacher Deployment and Transfers*	Mr. Yaling Tapo
28	Rozario Willie	*Biometric Attendance Tracking*	Mr. Nicholas Puy
29	Adrian Onnie Hassor	*Police Station e-Cell Management System*	Mr. Nicholas Puy
30	Elizah Barr	*Inventory Management System*	Mr. Nicholas Puy
31	Dick Gena	*Development of GUI Application for Census Data Collection in Gumine District, Papua New Guinea*	Mr. Nicholas Puy
32	Floyd Hamba	*Rental Property Management Systems Integration with Blockchain Technology: A Solution for PNG Property Management*	Mr. Cyril Sarsoruo
33	Issac Kintwa	*Employee Attendance and Payroll System (APS)*	Mr. Cyril Sarsoruo
34	Paul Kombiye	*Freelance Web App for Papua New Guinea*	Mr. Cyril Sarsoruo
35	Deborah Dairus	*Automatic Speech Recognition Model for Linguistic Documentation: Adapting Pre-trained Automatic Speech Recognition (ASR) Model for Papua New Guinean Languages*	Mr. Sankwi Abuzo
36	Evangelyne Gideon	*Secure E-voting using ID-based Generalized Blind Signcryption*	Mr. Sankwi Abuzo
37	Rohi Goiye	*Using Machine Learning to Aid in Early Detection of Breast Cancer in Papua New Guinea*	Mr. Sankwi Abuzo

Publications

The academic staff of the School of Mathematics and Computer Science at Papua New Guinea University of Technology have actively contributed to scientific research by publishing scholarly articles throughout the year 2024. These research publications reflect the faculty's commitment to advancing knowledge in their respective fields. Comprehensive details regarding these publications are documented below.

Journal Articles

Bhojan, R. (2024). A Character Level Word Encoding Deep Learning Model for Combating Cyber Threats in Phishing URL Detection. *Interdisciplinary Journal of Papua New Guinea University of Technology*, *1*(1), 76–88.

Bhojan, R., Rajagopal, M., & Ramesh, R. (2024). Big Data De-Duplication Using Modified SHA Algorithm in Cloud Servers for Optimal Capacity Utilization and Reduced Transmission Bandwidth. *Data and Metadata*, *3*, 245–245.

Bhojan, R., & Venkataraman, S. (2024). Big data analysis on network intrusion detection using high performance deep neural networks. *Journal of Advanced Research in Applied Sciences and Engineering Technology*, *55*(1), 167–176. https://doi.org/10.37934/araset.55.1.167176

Kazemilari, M., & Streimikiene, D. (2024). Network Analysis of Contractors' Assessment Factors. *Journal of International Studies*, *17*(3). 117-132. https://doi.org/10.14254/2071-8330.2024/17-3/6

Kazemilari, M., & Streimikiene, D. (2024). Topological Network Analysis and Its Application on Revealing Dimensions of Student Satisfaction Under the COVID-19 Pandemic. *Contemporary Economics*, *18*(4), 475-485, https://doi.org/10.5709/ce.1897-9254.550

Singh, A. K., & Patra, A. K. (2024). Cybersecurity Support in IoT: Causes and Solutions in Engineering. *International Journal of Scientific Research in Multidisciplinary Studies*, *10*(5), 107-119.

Singh, A. K., & Patra, A. K. (2024). Internet Protocol with Internet Programming (IP with IP): Architecture and Design. *International Journal of Scientific Research in Computer Science and Engineering*, *12*(4), 66–76.

Book Chapters

Singh, A. K., & Mirou, B. (2024). An Evaluation of the Impact of Circular Economy (CE) Models Based on AI and IoT for Job Creation and Reallocation. In Moharana, B.R., Behera, B.C., & Muduli, K. (Eds.) *Digital technology enabled circular economy* (pp. 50–70). CRC Press, Boca Raton, Fl, United States.

Conference Papers

Hamba, F., Willy, R., & Singh, A. K. (2024, July 1-4). *Rental Property Management System Integration with Blockchain Technology: Solution for PNG Property Management*. Paper presented at 7th National Science and Technology Conference, PNG University of Technology, Lae, Papua New Guinea

Patra, A. K., & Singh, A. K. (2024, July 1–4). *Artificial Consciousness and Intelligence*. Paper presented at 7th National Science and Technology Conference, PNG University of Technology, Lae, Papua New Guinea

Singh, A. K. (2024, March 23–25). *Internet Protocol with Internet Programming (IP with IP)*. Paper presented at CNASBE 2024: 8th International Conference on Computing in Natural Sciences, Biomedicine and Engineering, Athens, Greece

Singh, A. K. (2024, March 23–25). *Cybersecurity support in IoT: Causes and solutions*. Paper presented at CNASBE 2024: 8th International Conference on Computing in Natural Sciences, Biomedicine and Engineering, Athens, Greece.

Willy, R., Hamba, F., & Singh, A. K. (2024, July 1-4). *Feasibility Study on the Integration and Utilization of Small- and Large-Scale Biometric Systems*. Paper presented at 7th National Science and Technology Conference, PNG University of Technology, Lae, Papua New Guinea

Seminars and Workshops

A comprehensive overview of the in-house seminars delivered by the faculty members of the School of Mathematics and Computer Science at Papua New Guinea University of Technology during the year 2024 is presented below.

Semester	Date	Venue	Time	Presenter	Topic
1	07-March	MCS203	3-4pm	Dr. Chris Wilkins	*Linux OS*
1	13-March	MCS203	2-3pm	Prof. Hasan Gümral	*The Chiral Oscillator*
1	10-April	MCS203	2-3pm	Mr. Joseph Boi-UDC/ Mr. William Kep - UEL GM	*UDC Consultancy*

1	24-April	MCS203	2-3pm	Dr. Rajendran Bhojan	*AQAT and Block Chain Technology*
1	01-May	MCS203	2-3pm	Prof. Hasan Gümral	*On geometric problems in FEMs*
1	22-May	MCS101	1-2pm	Mr. Japath Tikil	*Practice for Sci Tech Conference*
1	22-May	MCS101	2-3pm	Mr. Harada, Mr. Mirou and Mr. Abuzo	*Dissemination of Recent DNS Conference Information*
2	31-July	MCS203	2-2:30 pm	Mr. Lenz Nerit	*tSMAS LMS Attendance Tracking Feature*
2	07-August	MCS203	2-3pm	Mr. Japath Tikil	*The POD and its Application to PDE's*
2	14-August	MCS203	2-3pm	Prof. Hasan Gümral	*Once Upon a Time... in West Persia*
2	21-August	MCS203	2-3pm	Mrs. Raunu Gebo Sarsoruo	*Comparative Analysis of Data Analysis Tools: R, Python, and Stata for Data Analysis, Teaching and Research*
2	28-August	MCS203	2-3pm	Mr. John Lanta	*Part 1: Criteria of Closedness of Nilradicals in Zero Dimensional Locally Compact Rings*
2	04-September	MCS203	2-3pm	Mr. Cyril Sarsoruo	*Using Ohlin Lemma to Prove Hermite-Hadamard Type Inequalities*
2	11-September	MCS203	2-3pm	Mr. Peter Helebi	*Proposed MCS Operations Tracking System*
2	18-September	MCS203	2-3pm	Prof. Hasan Gümral	*A Crash Course on Legendre Transforms*
2	25-September	MCS203	2-3pm	Mr. John Lanta	*Part 2: Criteria of Closedness of Nilradicals in Zero Dimensional Locally Compact Rings*
2	02-October	MCS203	2-3pm	Mr. John Lanta	*Part 3: Criteria of Closedness of Nilradicals in Zero Dimensional Locally Compact Rings*

Conclusions

The School of Mathematics and Computer Science at Papua New Guinea University of Technology has made significant strides in research and academic development in 2024. With a strong focus on areas such as Numerical Analysis, Theoretical Mathematics, Software Engineering, Statistical Science, IoT, and Mathematical Modeling, the school has demonstrated its dedication to advancing knowledge and fostering innovation. The launch of postgraduate programs, including the MSc in Applied Mathematics, marks an important milestone in the school's journey toward academic excellence. Additionally, ongoing research by postgraduate students at the PhD and

MPhil levels further strengthens the school's commitment to high-quality scholarship.

Despite these accomplishments, challenges remain, particularly concerning faculty composition and research infrastructure. The school has the potential to produce high-quality, well-researched academic papers, but achieving this goal requires both the necessary infrastructure and a highly qualified faculty. Currently, most academic staff members hold either a master's or a bachelor's (undergraduate) degree, which limits the school's ability to reach its full research potential. While the existing faculty members are dedicated and hardworking, a crucial catalyst for growth is the recruitment of additional professors and PhD-qualified academics to strengthen research output and elevate the school's academic standing.

Recognizing this need, the university has taken a proactive step by appointing two professors—one specializing in Applied Mathematics and the other in Computer Science—who are expected to join in 2025. This strategic move will significantly enhance the school's faculty capacity and research capabilities. However, further investment is needed to sustain long-term progress. The university should identify key academic areas requiring expertise and actively sponsor its Master's and Bachelor's degree holders to pursue advanced studies and obtain higher qualifications. Without such initiatives, the school's progress in research and academic excellence will remain constrained.

Moving forward, the school must continue to expand its research facilities, foster collaborations with international institutions and industry partners, and ensure that faculty members have the necessary resources and support to thrive. By addressing these critical needs, the school can enhance its research output, improve its academic reputation, and contribute meaningfully to the advancement of Mathematics and Computer Science in Papua New Guinea and the broader Pacific region.

CENTRES OF RESEARCH EXCELLENCE

CENTRE OF EXCELLENCE FOR BIOTECHNOLOGY (CEB)

Director: Professor Tom Okpul

The Centre of Excellence for Biotechnology (CEB), formerly the Unitech Biotechnology Centre was established by the Council of the Papua New Guinea University of Technology (PNGUoT) in 1997 in recognition of the immense role that modern biotechnology could play in contributing to national development. Although it operates under the auspice of the School of Agriculture, it reports to the Office of the Deputy Vice Chancellor.

Biotechnology is a powerful enabling technology, with applications that have the potential to revolutionize many industry sectors (including agriculture, forestry, fishing, pharmaceuticals and health, chemicals, textiles, food processing, environmental industries, energy, and mining). Appropriately, the current vision for the CEB 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". Hence, it 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.

Areas of Research

The following research focus areas have been identified for staff and student research:

- Evaluation of promising rice varieties for Papua New Guinea
- Development of Trichoderma as a Biocontrol agents
- Development of entomopathogenic fungi for biocontrol of important insect pests.
- Development of Vesicular-arbuscular mycorrhiza to improve crop production
- Crop improvement and adaptation to stress environments caused by climate change
- Development of a maize seed system for PNG
- Gene discovery in PNG wild rice: seed and grain characteristics
- Genetic transformations of taro and rice
- Development of fungal inoculum for artificial agar wood production in PNG
- Improving potato seed scheme.

Research Interests of Collaborating Academic Staff Members

No	Academic staff	Areas of research interest
1	Maino, Macquin, PhD	Plant Pathology, Nematology, Plant Viruses, Biocontrol Agents
2	Okpul, Tom, PhD	Plant Breeding and Genetics, Biotechnology
3	Dotaona, Ronnie, PhD	Agricultural Entomology, Integrated Pest Management, Biocontrol Agents
4	Ban, Gwendolyn, PhD	Plant Pathology, Biocontrol Agents
5	Poloma, Spencer, PhD	Crop Physiology, Agronomy
6	Inapo, Dollah, MSc (FPDA Staff)	Potato Tissue Culture

Postgraduate Students' Research

PhD

i) Denano, Sogoing. *Ecological Risk Assessment of Markham River and its Tributaries: A Case Study in Relation to Heavy Metals Contamination and Phyto-remediation*

ii) Maiguo, Eko. *Investigating the Impacts of the Exotic Naturalized Samanea saman* (Jacq.) Merr *Trees in Old Gold Dredging Sites in Bulolo Valley, Morobe Province*

iii) Kewa, Nick. *Value Chain Analysis of Taro: The Case of Marhkam District, Morobe Province, Papua New Guinea*

MPhil

i) Gomuna, Naomi. S. *Comparative Analysis of Food Safety and Phytosanitary Measures for Importing PNG Taro into Australia, New Zealand, Japan and USA*

MSc

i) Mark, Warendo. *Investigating Drought Tolerance Amongst Promising Dasheen and Eddoe Taro Varieties from Papua New Guinea*

ii) Wawah, Lisahpo. *Evaluating the Ploidy Level and Drought Tolerance of Dasheen × Eddoe Taro Hybrids Population*. Graduate Assistance Scholarship. MSc. Program.

iii) Puring, Raylin. *Evaluation of Reciprocal Progeny Population of Two Corn Varieties*

iv) Hannet, Godfrey. *Agro-Morphological Characterization of the Galip Nut (Canarium indicum) Population Maintained at the NARI-Kerevat Arboretum, East New Britain Province.*

Third Year Undergraduate Students' Research Projects

i) Schneider, Naghan. *Evaluating the Efficacy of Colchicine Doses for Generating Tetraploid Watermelons for Seedless Fruit Production*. School of Agriculture

ii) Sitapai, Arthurnasia. *Standardizing the Protocol for Regenerating Rice for Transformation Studies.* School of Agriculture

iii) Posing, Ernestine. *Evaluation of Media Types for Locally Grown Oyster Mushroom*. School of Agriculture

iv) Silih, Eronimus. *Assessing Callus Induction from Leaf Explants of the Eaglewood, Gyrinops ledermannii* Domke. School of Forestry

v) Tobias, Niel. *Examining in vitro Callus Induction on Aquilaria crassna Shoots and Seeds.* School of Forestry

vi) Wesley Wilson. *In vitro Callus and Shoot Induction of Cryptocarya massoy by Nodal Culture*. School of Forestry

Internal Research Collaborations

Wawah, L., & Okpul, T. (2024). *Evaluating the ploidy level and drought tolerance of dasheen × eddoe taro hybrids* [Grant awarded by the Postgraduate Studies, Research & Innovations Committee, PNG University of Technology, K17,194.22].

Gomuna, N. S., & Okpul, T. (2024). *Evaluating the ploidy level and drought tolerance of dasheen × eddoe taro hybrids* [Grant awarded by the Postgraduate Studies, Research & Innovations Committee, PNG University of Technology, K6,950.00].

Hannet, G., & Okpul, T. (2024). *Agro-morphological characterization of the galip nut (Canarium indicum) population maintained at the NARI-Kerevat Arboretum, East New Britain Province* [Grant awarded by the Postgraduate Studies, Research & Innovations Committee, PNG University of Technology, K15,770.00].

Acquisition of New Equipment

A "Nano Drop OneC Spectrophotometer" for Nucleic acid research at the Centre was acquired through the 1:1 funding arrangement offered by the Postgraduate Studies, Research & Innovations Committee.

External Research Collaborators

Campbell, B., Okpul, T., Smith, M., & Godwin, I. (2023–2026). *Enhancing drought tolerance and food security in Papua New Guinea: The potential of new taro germplasm* (ACIAR CROP-2023-194) [Grant awarded by the Australian Centre for International Agricultural Research (ACIAR), AUD 665,000]. Project partners: University of Queensland and PNG University of Technology. Initial grant period: November 15, 2023 – January 31, 2025; extended to January 2026 with additional funding.

CENTRE OF EXCELLENCE IN ENVIRONMENTAL RESEARCH (COEER)

Director: Dr. Patrick S. Michael

Introduction

The Environmental Research and Management Centre (ERMC) was established in 1993 and, in 2025, was renamed to the Centre of Excellence in Environmental Research (COEER) by the current board. The name change was needed to accommodate the mandated roles and responsibilities of the COEER in environmental research, focusing on environmental sustainability and sustainable use of natural resources with minimal negative impacts. Sustainable use and management of natural resources are impossible when the general environment is adversely impacted. Therefore, most research focuses on understanding the management of degraded environments using environment-friendly techniques and strategies. Most of these are underpinned by climate change and environmental sustainability. The management component includes contributions to policy and plan, e.g., biodiversity conservation, protected area establishment, regulation and control, monitoring and risk management, biosecurity and transboundary movement, and border surveillance. Developing regulatory frameworks for proper administration and management of the environment and natural resources towards benefit sharing, capacity building, research and development, and conservation and management underpin the overall research responsibilities of COEER.

Research and Development

In line with the renaming of the center and the PNGUoT Strategic Plan 2025 – 2029, the COEER has developed an implementation plan 2025 – 2029 covering three Strategic Initiatives: A reputable center of excellence for research, Research is solution-driven and Dynamic culture of scholarly publications. These three strategic initiatives were used to develop the Strategic Objectives, Goals, and Actions for the planning period. More so, a very strong board, with representation from the faculty of Natural Resources, Engineering, Sciences, Built Environment, and Humanities, was formed with a self-explanatory terms of reference. This is a significant initiative to provide COEER with strategic direction and oversight on the implementation of the strategy in the best interest of the University. Additionally, pooling technical expertise from various schools forming the Working Research Group provides COEER with the leverage and strength needed to do multi-disciplinary research and promote R&D.

Current Researches and Projects

A number of significant projects running at the moment and ongoing are:

(i) Certificate II in Project Planning and Management – The syllabus of this course has been written in consultation with Global Green Growth Institute (GGGI) and Climate Change and Development Authority (CCDA). Thirty-five students have been sponsored by GGGI and the course is taught online by staff of COEER, Civil Engineering and Mechanical Engineering. Those who have successfully completed the course have sat for the exam and towards the end of this year issued certificate. K70,000.00 total funding.

(ii) The PNGRIS2 – The PNG Resource Information System 2 (soil) with ACIAR has started and staff from COEER, Agriculture and Surveying and Land Studies are involved. This is a team project and Director of COEER is the team leader of the PNGUoT team. The project will end in December 2026. Over K500,000.00 total funding.

(iii) Project examining climate impact in PNG with Climate and Security Policy Centre at the Australian Strategic Policy Institute (Climate and Security Policy Centre, Australian Strategic Policy Institute (ASPI.) In partnership with ASPI, a concept paper was written for development.

(iv) Climate change, sustainable energy, and nuclear safety – This is an EU project at its very early stage. A Table of Partners Form was filled and sent with the CV of the Director.

(v) Irrigation and mechanisation of sweet potato production in PNG – opportunities and limitations. COEER and NARI have partnered with the University of Queensland to develop the concept notes, and submitted to ACIAR for consideration.

(vi) Improved sweet potato production management project – This project has advanced and further discussion with leaders from ACIAR and CSIRO are ongoing.

(vii) New Guinea Islands Cocoa Project – This is an ACIAR project where the first component has been completed, but COEER will be involved in several studies in the second component. Initial discussions have been held, and more direct involvement will occur as the second component of the project kick start in 2025.

(viii) Development of stereo-intelligent agricultural ecosystem monitoring system and its application with Yantai Institute of Coastal Research, Chinese Academy of Science, China. This project has reached the advanced stages and the Chinese team are seeking funding from their end in 2025.

(ix) A targeted and structured genetic and agronomic traits improvement approach for winged bean to contribute to food and nutritional security in PNG under climate change. APEP has funded K110,000.00 and the research is into full agronomic trial.

(x) Capacity building in the higher education sector (ERASMUS-EDU-2024-CBE) – The working document written has resulted in 12 fully funded master's student at K100,000.00 a student. More arrangements and discussions underway to organise supervisors.

(xi) The effects of climate change on the altitudinal shift of lowland crops into the highlands of Papua New Guinea: An investigation into the changes in agroclimatic conditions causing the altitudinal growth of lowland crops along the Okuk Highway – Pacific Development Research Grants, New Zealand & PNGSTS. Proposed total funding of K100,000.00 as a PhD project.

(xii) Turtle conservation project with Wafi Golfu – Discussion has advanced and arrangement for site visit in place, including training for students. Wafi Golfu, UPNG and COEER are working on the project and is ongoing.

(xiii) Managlas (Oro Province) Plateau Forest Climate and Biodiversity Project Funded by EU – COEER is in the final states of discussion with the Project Management team to engage students (postgraduate studies and undergraduate field practice). At this stage, students from the Department of Agriculture and Forestry are targeted.

(xiv) Central Cassava Farming Project with PNG Hydro Development Limited (Chinese Company) – COEER has been approached in 2023 initial inputs on the crop suitability assessment and following that, the company has visited again to develop an MOU for further involvement and student training.

(xv) Carbon Trade Project with PNG IPA and an investor from Dubai under the Green Climate Initiatives – This project has started in partnership with PNG IPA and the investor, initially working in the Woodlark Island, Milne Bay.

(xvi) Small Grant Application for US Embassy Port Moresby – US$50,000.00 proposal submitted. Proposal for environmental research.

(xvii) Capacity building in the field of higher education (ERASMUS-EDU-2024-CBHE – Over a million-kina worth of laboratory equipment submitted. Partner has resubmitted the proposal to EU in 2025.

(xviii) JICA PIM – PNGUoT Training Program – K246,685.00 proposal and budget submitted to Embassy of Japan, Port Moresby.

Postgraduate Projects

A number of postgraduate projects supervised out of COEER and are either in the final stages or ongoing are listed below.

The total number of PG students' projects under the supervision of the Director.

Names of students	Titles of the projects under taken
Topas Peter (MSc)	*The assessments of the effects on soil chemistry and responses of sweet potato in biomass production to organic matter in composted mounds in Papua New Guinea*. Graduating 2025.
Luke Jeffery (MSc)	*Agricultural use of treated human waste water to minimise environmental impact under humid lowland tropical agroclimatic conditions.* Student has withdrawn on personal reasons.
Levy Kasa (MSc)	*Agricultural use of treated piggery sludge to minimise environmental impact under humid lowland tropical agroclimatic conditions.* Completed and submitted for examination.
Elisha Napu (MPhil)	*Comparative assessment of the effects of Coffee and Oil Palm based agroecosystems on soil health under tropical agroclimatic conditions in PNG.* Student has withdrawn on personal reasons.
Shen Sui (MPhil)	*Organic matter amendment of swidden fields to maximize the yield of sweet potato along an altitudinal gradient in Papua New Guinea.* Graduating 2025.
Timothy Ngembil (MSc)	*Effects of Climate Change on Food Security: An Investigation into Temperature, Rainfall, and Topographical Paradigm in three Highlands Provinces of Papua New Guinea.* Student has withdrawn on personal reasons.
Shirelyna Aipa (MPhil)	*Evaluating the roles of organic matter application on soil fertility under cocoa and crop productivity under humid lowland agroclimatic conditions in Papua New Guinea.* Final stages of writing thesis.
Dominic Kia (MPhil)	*The effects of climate change on staple crop distribution, production systems and security: A case study of Iloko Village in Kabwum District, MP.* Student has withdrawn on personal reasons.
Paulus Kop (MPhi)	*Effects of Balsa plants on soil physiochemical properties and carbon sequestration potential in the Gazelle Peninsula, ENBP*.
Veronica Homband (MSc)	*The role of organic matter of varying nutrient content on soil fertility and yield of corn under humid lowland conditions in PNG.*
Noelyne Fandim (MPhil)	*Assessing the effects of climate change on storage pests under PNG lowland conditions.*
Jonah Anton (MPhil)	*Exploring the diversity of marita in various agro-ecological zones in the highlands and Momase in PNG based on morphological and physio-chemical characteristics.*
Nathanya Alfred (MSc)	*Investigating the effects of organic matter of varying nutrient contents on rooting and tuber formation of winged bean.*

Undergraduate Projects

The undergraduate students from the School of Agriculture who are undertaking researches with the COEER are listed below.

The total number of undergraduate students' projects under the supervision of the COEER Director in 2024.

Names of students	Titles of the projects under taken
Prisca Tiru	Investigating the effects of fallen rubber tree leaf biochar on soil properties
Denzel Alois	Investigating the effects coconut husk biochar on soil properties
Ezikiel Bobby	Investigating the effects of oil palm fallen leaf biochar on soil properties
Lawrence Kavie	Investigating the effects of cocoa pod wastes biochar on soil properties
Sauna Terrence	Investigating the importance of coconut shell biochar amendment for soil fertility management

Publications

Journals

Peter, T. M., & Michael, P. S. (2024). Augmenting of primary and secondary macronutrients by chopped *Leucaena* leaves used as organic matter in composted sweet potato mounds under tropical humid lowland conditions. *International Journal of Environment, 13*, 48–64.

Temai, S., Erain, A., Shong, G., Wiap, G., & Michael, P. S. (2024). The implication of biochar amendment and planting on sandy loam soil properties under humid lowland tropical agroclimatic conditions. *Malaysian Journal of Sustainable Agriculture, 8*, 43–50.

Conference Presentations

Michael, P. S. (2024, September 20–22). *The effects of cogon grass biochar application on sandy loam soil properties and tissue composition of nutrients under humid lowland tropical agroclimatic conditions*. Paper presented at the 2nd International Conference on Biochar Research and Application & 7th Asia Pacific Biochar Conference (ICBRA & APBC 2024), Shenyang nH Hotel, Shenyang, Liaoning Province, China.

Topas, P., & Michael, P. S. (2024, December 4–6). *The roles of organic matter of varying nutrient contents in composted mounds on sweet potato tissue composition of micronutrients in the lowlands of PNG*. Paper presented at the DevNet 2024 Conference: Shifting Landscapes of Development – Future Possibilities for Change, University of Otago, Dunedin, New Zealand.

WEEKLY RESEARCH SEMINAR

ABSTRACTS


Left to right: Loop reactor, solar reactors and essential-oil utilization (with Jayson Wau, PNGUoT staff; PC: M. Oelgemöller)

TABLE OF ABSTRACTS

INFORMATION RESEARCH TECHNIQUES

Percy Roary

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Abstract

In the digital age, accessing and utilizing information effectively is crucial for academic success. Matheson Library and other University libraries around the world play a pivotal role in providing resources and guidance for information research. This abstract explores various techniques employed in university libraries to facilitate effective information research. Examples include utilizing Boolean operators (such as and, or, not) to refine search queries, employing truncation and wildcard symbols to capture variations of keywords, and leveraging proximity operators (such as near) to specify the proximity of terms within search results. It delves into strategies such as database searching, reference services, citation management tools, and workshops offered by libraries to enhance students' research skills. Additionally, it highlights the importance of information literacy instruction and the integration of technology in modern library services. By utilizing these techniques, students can navigate the vast landscape of information more efficiently, ultimately contributing to their academic growth and success.

Keywords: Database Mining, Digital Information, Library Services

MULTIFUNCTIONAL APPLICATIONS OF METAL-BASED NANOMATERIALS

Ananda Murthy, H.C.

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Abstract

The nanomaterials have played a significant role in the scientific and technological advancement in the last few decades. The nanomaterials exhibit versatile properties such large surface area, high catalytic and photocatalytic activities, lowered band gap values, enhanced conductivity, etc. These nanomaterials can be synthesized by various physical, chemical and biological (green) methods. The present seminar discusses the various synthesis methodologies of various forms of nanomaterials including nanoparticles, nanotubes, nanowires, nanoflowers, nanorods, nanostars, etc. The modern nanomaterials find applications in many fields such as semiconductors, electro-optic materials, electrode materials, magnetic materials, catalysis, biomedicine and drug delivery system, removal of organic pollutants, antimicrobial activity and in the environmental remediation of pollutants. The awareness on the multifunctional applications of selected transition metal-based nanostructures will also be presented in this seminar.

Keywords: Material Science; Nanotechnology; Transitional Metals

CHALLENGES FOR FRICTION MATERIAL MANUFACTURERS

Janarthanan Gopalakrishnan

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Abstract

Friction materials are one single component in the whole of the automobile system that regulates the speed and stops vehicles thus ensuring safety. With growing technologies in automotive industries, friction materials are put to enormous challenges like very good and uniform performance over different vehicle operating conditions, excellent wear resistance and superior NVH (noise, vibration and harshness) characteristics for producing ideal friction recipes. Friction materials are composed of various ingredients categorized as binders, fillers, fibres, friction modifiers and metals. In this talk, various other challenges including Government regulations are discussed.

Keywords: Automobile Industries; Material Synthesis; Regulation of Noise, Vibration and Harshness

GREEN CHEMISTRY WITH LIGHT AND RENEWABLE MATERIALS

Michael Oelgemöller

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Abstract

In 1912 Giacomo Ciamician, a pioneer in synthetic photochemistry, presented his spectacular vision of the 'Photochemistry of the Future'. Over 100 years have passed, and organic photochemistry is still widely neglected by the chemical industry. Over the last years we have developed photodecarboxylations as an efficient access to macrocycles or Grignard-type addition products. Due to the high water-solubility of the starting carboxylates, these reactions can be conducted in aqueous media. Large-scale syntheses have also been realised using novel photoreactor concepts. The reaction has been furthermore used as a key-step in the synthesis of biologically active target compounds. To overcome the high energy demand of artificial light sources, natural sunlight can be used as a 'free' light source for the production of chemicals. We have realized a number of laboratory- to large-scale solar-chemical reactions in direct sunlight. All reactions utilized biomass-derived starting materials and gave complete conversions and excellent yields after short illumination times. The combination of micro dimensions and flow operation is especially advantageous for photochemical transformations. We have studied a series of photoreactions under (micro) flow conditions. In all cases examined, the flow reactions gave higher conversions or yields and better product qualities. We have also developed photochemical-thermal tandem processes for multi-step reactions to bioactive compounds *in series*. Parallel photochemical operations have also been conducted in a multi-capillary flow reactor. Agricultural waste and readily available essential oils can likewise serve as renewable materials for chemical transformations. In recent years, we have identified valuable pest control agents and strong antibiotic agents from natural resources. The presentation may also touch on our activities in photochemical water treatment and biodiesel production through photocatalysis.

Keywords: Green materials; Photocatalysts; Reactors

FATIGUE STRENGTH OF Al-INTERLAYER ALUMINIUM TO TITANIUM FRICTION STIR LAP WELDED JOINTS

Steve Ales

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Abstract

Fatigue testing was performed on welds joining AA2024 (Al4.5Cu1.4 Mg0.5Mn) alloy to Ti6Al4V alloy by having AA1100 strip as an interlayer utilizing friction stir lap welding (FSLW). During FSLW, the pin bottom was aimed not to touching the Ti6Al4V plate (d Pin≈ 0), although it could inadvertently penetrate (d Pin > 0) the Al interlayer to Ti6Al4V side. The results revealed that the fatigue limit of the Al-interlayer AA2024/Ti6Al4V welds slightly lower than the fatigue limits reported in literature for FSL Al-to-Al and Al-Ti welded alloys. Analysis indicated that the formation of an extremely thin interface layer during FSLW played a crucial role in enhancing fatigue strength within the machined groove. The diffusion weld distance outside the pin width differed between welds with d Pin ≈ 0 and d Pin > 0. Consequently, the fatigue limit of welds with d Pin > 0 was considerably higher compared to welds with dPin ≈ 0, despite the mix stir zone (MSZ) in welds with d Pin & gt; 0 being brittle. The distinct thermomechanical conditions associated with varying diffusion-weld widths within the groove will be elucidated. Additionally, incorporating an Al-interlayer during FSLW may offer further insights into fatigue strength and weld performance.

Keywords: Fatigue Strength; Dissimilar Alloys; Al-interlayer

MATERIAL REMOVAL RATE OPTIMIZATION IN EDM: IMPLICATIONS FOR PROMOTING SUSTAINABLE MANUFACTURING PRACTICES IN PAPUA NEW GUINEA

Kamalakanta Muduli

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Abstract

This research attempted to optimize Material Removal Rate (MRR) of titanium alloy 685 while machining it using Electric Discharge Machining (EDM). Four input parameters those influence MRR, Pulse on time (T_{on}), Current (I_p), Voltage (V), and duty cycle (t) are considered in this study. Three different levels of input values for these four parameters were finalized based on scanning of past literature. MRR values were recorded for different combinations of input parameters. This research proposed Jaya algorithm for optimizing the MRR value. Optimum value of MRR achieved in this research is 4.6774 mg/minute, and the optimum combination of input parameters to achieve this is, Ip (8 A), T_{on} (150 µs), duty factor (37.1362 %) and V (40 V). This research also highlighted several implications for promoting sustainable manufacturing practices in Papua New Guinea.

Keywords: Electric Discharge Machining (EDM); Material Removal Rate (MRR); Optimization

UNPACKING THE PNGUOT SMART CAMPUS: THE 48-87 MATRIX

Ken Polin

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Abstract

PNGUoT as inherent in its name is the only large university in PNG which is exclusively predominant in technological academic programs and researches. It aspires to thrive among the global community by offering its flair and unique qualities. Its current vision of developing worldclass technocrats for the real-world attempts to market its prowess. Like all universities around the globe, it is however vulnerable to the rapid emergence of AI and needs to embrace its impact by becoming smart. It should therefore adopt the smart campus approach to become versatile in this dynamic and pluralistic environment. The '48-87 Matrix' is harnessed from the Smart Campus 48 Indicators and the 87 Objectives of the PNGUoT Strategic Plan. It aligns the smart campus framework with the university's strategic plan for strategic position within the rapid phase of global business. The smart campus framework has 4 dimensions of; 1. Smart economy, 2. Smart society, 3. Smart environment and 4. Smart governance. The university's strategic plan on the other hand has 7 domains of; 1. Governance, 2. Academic excellence, 3. Research, innovation and training, 4. Organizational effectiveness and performance, 5. Access, externalization and infrastructure, 6. Financial sustainability, and 7. Community, industry and international partnerships. The matrix successfully sets out the course for the university to perform its 4 primary roles (4PRs) facilitated by the 3 primary functions (3PFs) of the smart campus.

Keywords: Dimensions; Domains; Strategic Plan; Management

SUSTAINABLE PLANNING FOR THE DEVELOPMENT OF SITE-SPECIFIC RUN-OF-RIVER HYDROPOWER - A CASE STUDY IN GONOVO RIVER CATCHMENT, FINSCHHAFEN DISTRICT, PNG

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Abstract

The research explores the integration of emerging technologies to support sustainable rural electrification planning. By merging advanced technologies, it comprehensively assesses environmental, social, and economic dimensions to unlock renewable energy potential, particularly in rural areas. Through the integration of scientific and engineering concepts, the study aims to efficiently identify and leverage renewable energy resources to meet community demands. Using a case study methodology, it evaluates the viability of run-of-river hydropower systems, meticulously analyzing topographical, hydrological, socio-economic, and environmental factors. Various configurations of run-of-river infrastructure are considered, with projections indicating potential net power outputs ranging from 81 to 336 kW at sites 1, 2, and 3 under low flow conditions. Risks such as infrastructure instability, flooding, and inundation are addressed during planning and design phases to achieve the

targeted electricity output. Notably, the total electricity demand for 385 households inclusive of public institutes within, and surrounding the study region, stands at 598 kW. Sites 1 and 2 are capable of powering two villages each, while site 3 can supply four villages, contingent upon governance and monitoring of appliance usage.
Keywords: Renewable energy; Run-of-river Hydropower; Sustainable energy planning

THE SPECIAL TERTIARY ADMISSION TEST (STAT-P) IS POSITIVELY AND SIGNIFICANTLY RELATED WITH PERFORMANCE OF STUDENTS AT THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

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Abstract

The Special Tertiary Admission Test (STAP-P), designed by the Australian Centre for Educational Research (ACER) for Papua New Guinea (PNG), is jointly administered by ACER, the PNG University of Technology, University of Goroka and the Pacific Adventist University as part of their selection criteria for admitting first year students since 2016. STAT-P is similar to other forms of aptitude tests conducted by ACER which are used by universities in Australia, New Zealand, UK, and Ireland but has been adapted and refined to minimize cultural bias and language issues as may be peculiar to PNG. STAT-P does not test in-depth knowledge of specific academic disciplines and, it is not designed to predict a candidate's level of achievement in a specific discipline at the University. However, as an admission tool, it is required of STAT-P to have a positive relationship with an outcome criterion. This relationship has not been studied since inception of the test. Therefore, the primary objective of this study was to establish the predictive validity of the STAT-P test using data that has been gathered on one cohort in 2018. The results show that a positive and significant linear relationship exists between STAT-P marks and test marks obtained for a common subject that is taken by all students in the first year. This result reinforces the rationale of the continued use of STAT-P as a valid admission tool. This could also broaden the inclusiveness of students who are admitted to different courses at the university irrespective of socio-cultural background.

Keywords: Aptitude test; Assessment; Enrolment; Learning; Teaching

THE FINANCIAL INCLUSION AND PNG SME SECTOR

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Abstract

Small and medium-sized enterprises (SMEs) constitute the most dynamic firms in emerging economies. The general problem of the SMEs in PNG is ineffective cash flow management due to a lack of management and government funding initiatives to support and train entrepreneurs. The registration processes are easy compared to other business types. As a result, SMEs outnumbered other business types and were widespread throughout the nation. Despite their prevalence, recent research indicates that 60% of SMEs fail within five years. SMEs comprise at least 80% of businesses in developed and developing nations, contribute 40% to 60% of GDP, and produce 35% of global exports and 40% of industrial output globally. The study aimed to gather opinions and find the weaknesses and strengths of SMEs practicing accounting, tax, and active participation in financial inclusion. Due to large number of SMEs (473) in the country, the researchers applied the purposive sampling method. Data was gathered through observations, questionnaires, interviews, and group discussions from Lae, Port Moresby and East New Britain. The study recommends sharing knowledge is necessary for adopting innovative cash management models and practices that align with the research's purpose. By implementing financial literacy, businesses can improve the correlation between digital payments and financial success. Another recommendation was establishing a financial inclusion program and financial sector to close the formal and informal labour market movement gap. It legalized the accounting system of SMEs in PNG, and the government has to provide financial support for the start-up SME owners from the financial institution. A sound financial plan is essential to keeping the SME profitable.

Keywords: Cash Management Model; Financial Institutions; SMEs Failure

SHORELINE PROTECTION

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Abstract

It is undeniable that global warming and climate change are affecting coastal areas' shoreline stability due to sea level rise and coastal erosion. It was evident that the coastal erosion is a threat to the residence's houses, livelihood, its water resources which is located near the shoreline at the Busamang Ward 15, Salamua LLG, Morobe Province. To protect this, the authors explore the utilization of geosynthetic materials available on the market and introduce a possible geosynthetic alternative. The study is conducted through fieldwork, by observation, experimental, and numerical. The study shows the great threat that the inhabitants of the island to their source of water supply, the residential areas, their livelihood and the available geosynthetic materials on the market (such as reinforced geomats, geotubes, geotextile) can support the risks. However, the cost for such is not affordable by the island inhabitants so an alternative geosynthetic material

that solves an emerging issue of vast plastic disposals was explored to be utilized, such as geo-wall breakwater from LDPE plastics or bottled water break-water and geo-tetrapods.

Keywords: Geosynthetics, LDPE, Plastics

PLANT HEALTH CLINIC: LESSONS FROM A PILOT PROJECT IN EASTERN HIGHLANDS PROVINCE

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Abstract

Plant Health Clinic (PHC) was introduced to the Pacific Island countries in 2012 in Solomon Islands. Since then, in Fiji, Tonga, Samoa, and Vanuatu and recently into Papua New Guinea in 2022. The University of Goroka (UoG) recognised the importance of PHC as an important approach for farmer access to information to improve production. Hence and in partnership with the National Agriculture Research Institute introduced PHC as a pilot project in Eastern Highlands province. The PHCs are seen as a way of advising farmers on insect and diseases, soil and abiotic problems. They operate in the similar way to health clinics that advice and treat humans. The key is to train extension agents to gain knowledge to diagnose problems and to give farmers a prescription describing recommended pest and disease management options. The UoG recognised the synergy between education, research, extension and lead farmers and has developed curriculum and relevant training pathways. Participatory methods; photovoice and LEGO Serious Play were used to facilitate learning. The PHC was implemented as part of a sub-regional project - Responding to emerging pest and disease threats to horticulture in the Pacific islands, with support from the Australian Centre for International Agriculture Research.

Keywords: Agricultural Extension; Diagnosis of Pests and Diseases; Participatory Methods

THE SOUTH PACIFIC ECONOMY AND ITS GEOPOLITICAL IMPLICATIONS

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Abstract

This research investigates the complex geopolitical forces shaping the South Pacific economy, particularly concerning the region's aspirations for self-sufficiency and environmental sustainability. In light of the intensifying interests of global powers such as the United States and its allies—Australia, Japan, India, and New Zealand—alongside China, the region has witnessed escalating engagement. The study aims to dissect the geopolitical and geoeconomic determinants that influence Pacific nations. Utilizing a rigorous analytical methodology, data from a range of sources, including academic literature, policy documents, and media reports, have been meticulously scrutinized within both historical and contemporary frameworks. The findings reveal a

spectrum of challenges, opportunities, and concerns confronting the South Pacific in its pursuit of self-sufficiency and sustainability. A particular emphasis is placed on deepening integration with the rapidly growing economies of China and India. The study advocates for a balanced and strategic approach in Pacific-China-India relations, aiming to harness these relationships for economic progress. Crucially, it highlights the transparent and sustainable nature of China's initiatives in the region, emphasizing their tangible benefits for Pacific communities. The recommendations call for fostering transparent, sustainable, and mutually advantageous cooperation with both China and India to advance economic prosperity and ensure geopolitical stability in the Pacific.

Keywords: Global Powers; Economic Progress; Sustainable Cooperation

STUDY ON SEISMIC PERFORMANCE OF CONCRETE GRAVITY DAM LOCATED IN RING OF FIRE IN PAPUA NEW GUINEA

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Abstract

Papua New Guinea (PNG), with its abundant natural resources, high rainfall, and favorable topography, has significant potential for hydropower development. As the global focus shifts to renewable energy to combat climate change, hydropower emerges as a clean, green, and cost-effective electricity source. However, PNG's location within the seismically active Ring of Fire presents engineering challenges for constructing large infrastructure like dams. This study assesses the seismic performance of a proposed 60-meter-high concrete gravity dam for the Bapa hydropower project on the Snake River in Bulolo District, Morobe Province. The region's complex tectonic setting—marked by interactions among the Australian, Pacific, and Caroline plates—necessitates robust seismic design. Site-specific seismic data from the Probabilistic Seismic Hazard Assessment (PSHA) and geotechnical inputs from SMEC were utilized. The dam is to be founded on fresh Phyllite bedrock about 20 meters below the riverbed. Stability analyses were conducted per U.S. Army Engineering Manual EM 1110-2-2200 for sliding, overturning, and base pressure. A 3D finite element model of the dam's Non-Overflow Block was developed using STAAD PRO V8i, incorporating gravity, water, and silt loads. Dynamic response spectrum analysis, based on USACE EM 1110-2-6050, was carried out for Operation Based Earthquake (OBE, 1-in-500 years) and Maximum Design Earthquake (MDE, 1-in-1000 years) conditions. Results indicated satisfactory performance, with tensile stresses at the upstream toe and upper downstream face, and compressive stresses at the base. Over 96% mass participation confirmed the model's reliability. Findings support the dam's feasibility, with scope for design optimization through further dynamic analysis.

Keywords: Dynamic Spectrum analysis; Hydropower; Compressive Stress

ALLOCATION OF RESEARCH AND CONFERENCE FUNDS

In 2024, the research and conference funding amounted to K 561,441.24 as presented in the Table below. About 70% was allocated to research conduct and 30% was approved for dissemination of research findings.

Meeting No	Research Funding	Conference Funding	Total (Kina)
PSR&IC Meeting No. 15	15, 000.00		15, 000.00
PSR&IC Meeting No. 16	58,950.40	61,410.09	120,360.49
PSR&IC Meeting No. 17	81,657.15	51,790.00	133, 447.15
PSR&IC Meeting No. 18	235,415.70	57,217.90	212,934.18
Total	**391,023.25**	**170, 417.99**	**561,441.24**
Grand Total	**K 561,441.24**		