PROF. PIUS ADEWALE OWOLAWI

BTech. (Hons) (FUTA), MSc. (UKZN), PhD. (UKZN), Adv. Dip. (EIT), CCNA, CCNP, MCSE, CWNA, CWNP, CFOT, CFOS/D, MIEEE, SAIEE, SARL, SAEMSAT, ECSA (Reg. No: 2018400031)

Residence: USA and SA Residence permit holder

CONTACT

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PROFESSIONAL PROFILE

Prof. Pius Adewale Owolawi is a distinguished academic, engineer, and thought leader in Fourth Industrial Revolution (4IR) education and innovation. He currently serves as the Assistant Dean for Industry Liaison, Special Projects, and Work Integrated Learning at the Tshwane University of Technology (TUT), where he drives collaborative strategies that bridge academia, industry, and community. His portfolio includes advancing innovation ecosystems, implementing cooperative education models, and fostering sustainable skills development.

He previously served as Head of Department in Computer Systems Engineering at TUT and Electrical Engineering at Mangosuthu University of Technology, where he led curriculum modernisation, initiated 4IR-oriented postgraduate offerings, and facilitated local and international accreditation processes. He also established the 4IR Research Laboratory during his tenure as the MICTSETA Research Chair in 4IR Skills Development, promoting research in smart systems, IoT, AI, and machine learning.

Prof. Owolawi holds the following academic qualifications:

- *PhD (Eng) in Electronic Engineering, University of KwaZulu-Natal (UKZN), South Africa (2010)*
- *MSc (Eng) in Electronic Engineering, UKZN, South Africa (2006)*
- *B.Tech (Hons) in Applied Physics/Electronics, Federal University of Technology, Nigeria*
- *Adv. Dip. in Remote Engineering, Mechatronics & Robotics, Engineering Institute of Technology, Australia*
- *PGCert in Artificial Intelligence & Machine Learning, University of Texas at Austin, USA*
- *PGCert in Data Science & Business Analytics, University of Texas at Austin, USA*
- *PGDip in Cloud Computing & Digital Marketing, Great Lakes Institute of Management, India*
- *PGDip in Digital Marketing, Great Lakes Institute of Management, India*
- *Certificate in Management Development Programme (MDP), University of Stellenbosch Business School, South Africa*
- *LLB (in progress), University of South Africa (UNISA)*

LIFE PHILOSOPHY QUOTE:

"Kindness is seeing the best in others when they cannot see it in themselves"

- *Unknown*

"Our task must be to free ourselves from this prison by widening our circle of compassion to embrace all living creatures and the whole nature in its beauty."

- *By Albert Einstein*

TEACHING QUOTE:

"I hear and I forget. I see and I remember. I do and I understand."

- *Unknown*

"If you want to win in the 21st century, you have to empower others, making sure other people are better than you. Then you will be successful"

- *By Jack Ma*

RESEARCH QUOTE:

"Research is what I am doing when I don't know what I am doing"
-By Wernher Von Braun

"Research is a formalized curiosity. It is poking and prying with a purpose"
-By Zora Neale Hurston

He began his professional career as a Resident Network Engineer at the Central Bank of Nigeria, before transitioning into academia and research leadership. Prof. Owolawi holds multiple professional and technical certifications including CCNA, CCNP, CWNA, CWSP, MCSE, as well as specialist certifications in Fibre-Optic Design (CFOS/D), Radio Planning, and Wireless Network Optimisation.

He is a registered member of prominent engineering bodies including:

- *Engineering Council of South Africa (ECSA)*
- *Institute of Electrical and Electronics Engineers (IEEE)*
- *South African Institute of Electrical Engineers (SAIEE)*
- *South African Radio League (SARL)*
- *South African Amateur Radio Satellite Association (SA AMSAT)*

Prof. Owolawi has worked extensively with public and private entities such as Eskom, Transnet, GIZ, MICTSETA, and various SETAs, contributing to energy projects, IoT implementations, and research commercialisation. His academic contributions include the development and accreditation of engineering qualifications across multiple institutions and levels, and curriculum review for the Council on Higher Education (CHE).

His research specialisations span:

- *Hybrid Renewable Energy Systems*
- *Wireless and Optical Communication Systems (FSO, mmWave)*
- *AI and Machine Learning Applications in Image Processing and Vision-based research problems.*
- *IIoT and Smart Infrastructure*
- *Electromagnetic Modelling*
- *Activity Recognition and Medical Imaging*

He has authored over 200 peer-reviewed scientific publications, received more than 2,000 citations, and has delivered keynotes and lectures at global platforms. Recognised among Africa's Top 500 Researchers (2015–2020), he has received multiple academic accolades including:

- *TUT Faculty of Engineering's Most Outstanding Researcher (2012, 2014, 2016)*
- *Senior Researcher of the Year (2018, 2021)*
- *Vice-Chancellor's Teaching Excellence Award (2015)*
- *Best Engineering Mentor, UKZN (2006)*
- *Best Paper Award, International Conference on Applied and Theoretical Information Systems Research (Taipei, 2012)*
- *Alumni of the Brown International Advanced Research Institute (BIARI), Brown University, USA (2013)*

Prof. Owolawi continues to shape South Africa's academic and innovation landscapes through ongoing projects in AI for Agriculture, medical and financial at TUT National AI institute, and Project lead in the Learning Management System (LMS) development. His transdisciplinary expertise and commitment to human capital development position him as a central figure in Africa's 4IR transformation journey.

PERSONAL DATA

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CONTACT DETAILS

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KEY TECHNICAL & NON-TECHNICAL SKILLS

KEY TECHNICAL SKILLS

Artificial Intelligence & Data Science

- Machine Learning (Supervised, Unsupervised, Ensemble Methods)
- Deep Learning (CNNs, RNNs, Transformers, GANs)
- Natural Language Processing (NLP) & Word Sense Disambiguation
- Computer Vision & Image Analysis (OpenCV, YOLO, UNet, DeepLab)
- Reinforcement Learning & Agentic AI
- Explainable AI (SHAP, LIME)

Data Engineering & Analytics

- Data Wrangling & Feature Engineering
- Big Data Tools (Apache Spark, Hadoop)

- Data Pipeline Development (Airflow, Kafka, ETL/ELT)
- Relational & NoSQL Databases (MySQL, PostgreSQL, MongoDB, Cassandra)
- Time Series Forecasting (ARIMA, Prophet, LSTM)
- Cloud Platforms (AWS, GCP, Azure – especially AI/ML services)

Programming & Software Engineering

- Python (TensorFlow, PyTorch, Scikit-learn, Pandas, NumPy, FastAPI)
- R (caret, tidyverse), MATLAB/Simulink
- C/C++, Java, JavaScript (Node.js, React), SQL
- Git/GitHub, Docker, Kubernetes, CI/CD
- Linux/Unix shell scripting
- Microservices and RESTful API development

Embedded & Hardware Systems

- IoT Architecture & Integration
- Mechatronics & Robotics (ROS, Arduino, Raspberry Pi)
- FPGA/ASIC Design & Digital Signal Processing (VHDL, Verilog, MATLAB)
- Wireless Communication Systems (FSO, mmWave, 5G)

Network & Telecom Systems

- Network Design & Simulation (NS2/NS3, OPNET)
- Protocol Engineering & Radio Frequency Optimization
- Fibre Optics, RF/ Microwave Link Design (Pathloss, iBwave)
- Satellite & Antenna Systems (HFSS, CST)

Modelling, Simulation & Optimisation

- Operations Research & System Modelling
- Energy Hybridization & Smart Grid Simulation
- Mathematical Optimization (Linear, Non-linear, Stochastic)
- Engineering Computation (Ansys, COMSOL)

Research & Academic Tools

- LaTeX, EndNote, Mendeley, Zotero
- Bibliometric & Scientometric Analysis (VOSviewer, R-bibliometrix)
- Systematic Literature Review (PRISMA, Meta-analysis)

KEY NON-TECHNICAL SKILLS

Leadership & Strategic Management

- Academic Programme Development & Curriculum Design
- Research Project Management & Funding Acquisition
- Strategic Planning and Innovation Leadership

- Change Management in Higher Education Institutions

Work-Integrated Learning (WIL) & Industry Engagement

- Stakeholder Relationship Management (HEIs, TVETs, SETAs, Industry)
- Public-Private Partnership Development
- Cooperative Education Models & Student Employability Strategy

Teaching & Mentorship

- Postgraduate Supervision & Research Capacity Building
- Blended & e-Learning Pedagogy (Moodle, Blackboard)
- Interdisciplinary Teaching (Engineering, Law, AI)

Communication & Policy Advocacy

- Technical & Grant Proposal Writing
- Policy Brief Development (Education, 4IR, Digital Skills)
- Keynote Speaking & Science Communication
- Legal Literacy in Tech (AI ethics, IP, data governance)

Cognitive & Soft Skills

- Critical Thinking & Analytical Reasoning
- Problem Solving in Complex and Multidisciplinary Contexts
- Creativity & Innovation
- Cultural Intelligence & Inclusivity
- Resilience & Adaptability in Dynamic Research Environments

EDUCATION HISTORY

Classical Qualifications

1. **Doctor of Philosophy (PhD) in Electronic Engineering**
   University of KwaZulu-Natal (UKZN), Durban, South Africa
   2006 – 2010
   Specialised in advanced wireless communication, signal processing, and energy-aware systems.
2. **Master of Science (MSc) in Electronic Engineering**
   University of KwaZulu-Natal (UKZN), Durban, South Africa
   2004 – 2006
   Focus on telecommunications systems, electronic circuit design, and network optimisation.

3. **Bachelor of Technology (B.Tech Hons) in Applied Physics/Electronics**
   Federal University of Technology, Akure, Nigeria
   1996 – 2001
   Honours degree with concentration in electronics, instrumentation, and embedded systems.
4. **Advanced Diploma in Remote Engineering, Mechatronics, and Robotics**
   Engineering Institute of Technology (EIT), Australia
   2015 – 2016
   Covered automation, remote control systems, and intelligent robotics engineering.
5. **Certificate in Management Development Programme (MDP)**
   University of Stellenbosch Business School, Stellenbosch, South Africa
   2013 – 2014
   Training in leadership, strategic innovation, and executive management.

Postgraduate Programmes and Executive Education

6. **Postgraduate Programme in Artificial Intelligence and Machine Learning**
   University of Texas at Austin, USA
   2019 – 2020
   Focused on machine learning, deep learning, computer vision, and AI applications.
7. **Postgraduate Programme in Data Science and Business Analytics**
   University of Texas at Austin, USA
   2020 – 2021
   Data analytics, predictive modelling, and data-driven business strategy.
8. **Postgraduate Programme in Cloud Computing**
   Great Lakes Institute of Management, India
   2020 – 2021
   Training in cloud infrastructure, deployment strategies, and SaaS/IaaS models.
9. **Postgraduate Programme in Digital Marketing**
   Great Lakes Institute of Management, India

April – August 2022

Focus on digital branding, SEO/SEM, and social media strategy in the digital economy.

10. **Postgraduate Programme in Cybersecurity**

    University of Texas at Austin, USA

    January – July 2024

    Covers cybersecurity frameworks, threat intelligence, network security, and governance.

Ongoing Studies

11. **Bachelor of Laws (LLB) – In Progress**

    University of South Africa (UNISA), Pretoria, South Africa

    2018 – Present

    Legal studies focused on intellectual property, technology law, AI ethics, and cyber law.

PROFESSIONAL MEMBERSHIP

- **Registered Member**, *Engineering Council of South Africa (ECSA)*
- **Member**, *Institute of Electrical and Electronics Engineers (IEEE)*
- **Member**, *South African Institute of Electrical Engineers (SAIEE)*
- **Member**, *South African Radio Amateur League (SARL)*
- **Member**, *South African Amateur Radio Satellite Association (SA AMSAT)*

PROFESSIONAL CERTIFICATIONS

Certifications

1. **Drone Operations (Remote Pilot Licence)**

   South African Civil Aviation Authority (SACAA)

   2025

   Accredited through RPL, validating prior expertise in drone piloting, safety

protocols, aerial operations, and compliance with SACAA regulations for commercial Unmanned Aircraft Systems (UAS).

2. **Cisco Certified Network Professional (CCNP)**
   Cisco Systems
   Renewed July 2013
   Advanced certification covering enterprise networking solutions, routing and switching, and network troubleshooting.
3. **Cisco Certified Network Associate (CCNA)**
   Cisco Systems
   Renewed July 2013
   Validated proficiency in network fundamentals, IP services, security fundamentals, and automation.
4. **Certified Radio Frequency (RF) Planning & Optimisation Engineer (2G – 4G)**
   TeleResources Engineering Ltd (Australia)
   Awarded July 2011
   Specialised training in RF planning, optimisation, and performance tuning for multi-generation cellular networks.
5. **RF Planning Courses**

- *Introduction to RF Planning*
- *RF Planning for GSM & UMTS Networks*
- *RF Planning for WiMAX Networks*
- *RF Planning for LTE Networks*

  Completed with distinction, covering theoretical and practical design aspects of various wireless standards.

6. **Certified Fibre Optic Design Specialist (CFOS/D)**
   Triple Play Fibre Solutions, South Africa
   August 2010
   Specialisation in designing structured fibre-optic networks, loss budgeting, and system layout for telecom infrastructure.
7. **Certified Fibre Optic Technician (CFOT)**
   Triple Play Fibre Solutions, South Africa

February 2010

Competence in fibre splicing, testing, troubleshooting, and installation in alignment with global standards.

8. **Microsoft Certified Systems Engineer (MCSE)**

   Microsoft Corporation

   March 2008

   Certification in designing and implementing Windows-based business infrastructure and enterprise solutions.

9. **Certified Wireless Security Professional (CWSP)**

   Certified Wireless Network Professionals (CWNP)

   August 2006

   Expertise in securing wireless networks, implementing encryption protocols, and managing enterprise WLAN security.

10. **Certified Wireless Network Administrator (CWNA)**

    Certified Wireless Network Professionals (CWNP)

    August 2005

    Comprehensive foundation in wireless networking concepts, RF behaviour, WLAN architecture, and deployment.

PROFESSIONAL AFFILIATIONS: ACADEMICS AND INDUSTRIES

- Member of the Institute of Electrical and Electronic Engineers (IEEE)
- Member of the South African Institute of Electrical Engineers (SAIEE)
- Member of the ARRL, South African Radio League (SARL)
- Member of South African Amateur Radio Satellite Association (SA AMSAT)
- Member of Fibre Optics Association (USA)
- Cisco Certified Engineer (CCNA, CCNP)
- Wireless Certified Engineer (CWNA, CWSP)
- Microsoft Certified Engineer (Microsoft Cooperation)

PROFESSIONAL INDUSTRIAL TRAINING/ CERTIFICATE OF ATTENDANCE

Advanced Technical and Industry Training

- **NEC3 Engineering and Construction Contract**
  Certificate of Attendance – NEC Contract Training
  March 2016
- **PV Solar Installation (In-house Training)**
  Practical Workshop on Photovoltaic System Setup and Installation
  December 2015
- **SIEMENS Training Centre, Durban – Certified Modules**
  October 2014
    - Fundamentals of PLC
    - SIMATIC S7 Programming 2
    - SIMATIC HMI – Operating & Monitoring with WinCC
- **Intelligent Systems Professional Workshop, South Africa**
  May – June 2015
    - Apple iOS Development
    - Google Android Mobile Development
    - Windows Phone 8 Mobile Development
- **NOSA South Africa – Apply SHE Principles and Procedures**
  Occupational Health, Safety, and Environmental Compliance
  September 2014
- **Partnership in Higher Education & Skills Development**
  Sector Collaboration and Education Policy Workshop
  June 2014
- **ENDNOTE X7 Training Workshop**
  Academic Referencing and Research Management Software
  October 2013
- **MICROCHIP Embedded Systems Training – MPLAB X & DSP Theory**
  August – October 2013
    - C Programming & PIC18 Architecture
    - dsPIC Applications & Digital Signal Processing
- **Project Management Professional (PMP) Training**
  Fundamentals of Project Management
  July 2010

- **Cisco Networking Academy – Mangosuthu University of Technology**
  March 2010
- **African Regional International Heliophysical Year (AFRIS) School**
  Scientific Research School on Atmospheric & Space Physics
  July 2011
- **ICTP-ITU/BDT School on Wireless ICT for Low-Cost Solutions**
  Cost-Effective ICT Solutions for Developing Countries
  February – March 2009
- **Laser Safety Training – Basic Certification**
  Safe Operation and Handling of Laser Systems
  April 2007
- **Eskom Demand Side Management (DSM) Training – CPUT**
  Energy Efficiency & Load Management Techniques
  March 2006
- **Online Certification – A+, N+, Windows 2000 Professional & Server**
  March 2003

SOFTWARE AND TECHNICAL SKILLS

AI, Data Science & Machine Learning

- **Python Ecosystem**: Jupyter Notebook, NumPy, Pandas, Scikit-learn, TensorFlow, Keras, PyTorch, XGBoost
- **R for Statistical Computing**: RStudio, Tidyverse, Shiny
- **ML/AI Tools**: Google Colab, MLflow, Hugging Face Transformers
- **AutoML Platforms**: H2O.ai, DataRobot, Microsoft Azure AutoML
- **Annotation & Labeling Tools**: CVAT, LabelImg, Label Studio

Data Engineering & Big Data

- **ETL/ELT Tools**: Apache NiFi, Talend, Airflow
- **Big Data Frameworks**: Apache Spark, Hadoop, Kafka
- **Database Technologies**: SQL, PostgreSQL, MySQL, MongoDB, Cassandra

- **Cloud Platforms**: AWS (S3, SageMaker, Lambda), Google Cloud Platform (BigQuery, Vertex AI), Microsoft Azure (Data Lake, Synapse)

Communication & Radio Engineering

- **Simulation & Analysis**: HFSS, CST Microwave Studio, Keysight ADS, FEKO
- **Antenna/Propagation**: 4nec2, WinProp, iBwave Design
- **Spectrum Planning**: Spectrum-E, ICS Telecom
- **SDR Tools**: GNU Radio, SDR# (Software Defined Radio)

Embedded Systems, Robotics & Mechatronics

- **Microcontroller IDEs**: Arduino IDE, STM32CubeIDE, Keil uVision
- **Robot Operating System**: ROS, Gazebo, Rviz
- **FPGAs**: Vivado, Quartus Prime
- **Digital Design & Simulation**: ModelSim, VHDL/Verilog IDEs

Statistical & Research Software

- **Statistical Analysis**: SPSS, Stata, Minitab, JMP
- **Bibliometric Tools**: VOSviewer, R-bibliometrix, ScientoPy
- **Qualitative Data Tools**: NVivo, Atlas.ti
- **Systematic Review Tools**: Rayyan, Covidence, EndNote, Zotero, Mendeley

Grant Writing, Research Management & Collaboration

- **Reference Managers**: EndNote, Zotero, Mendeley
- **Project Management**: Trello, Asana, Notion, Microsoft Planner
- **Proposal Development & Review**: GrantHub, Pivot-RP, Grammarly Premium (for proposal refinement)
- **Collaboration Tools**: Overleaf (for LaTeX), Microsoft Teams, Slack, Zoom, Google Workspace

Engineering Design & Simulation

- **AutoCAD Electrical / Mechanical / Civil 3D**

- **SolidWorks / Autodesk Inventor**
- **Simulink / Simscape / PLECS**
- **PowerWorld Simulator / DIgSILENT PowerFactory**

Document Typesetting & Publishing

- **LaTeX Editors**: Overleaf, TeXstudio
- **Publishing Tools**: Adobe InDesign, Microsoft Publisher
- **CV/Portfolio Builders**: Canva, Novoresume

COMMUNITY VOLUNTEER SERVICE AND SOCIAL IMPACT INITIATIVES

I am deeply committed to social upliftment and community empowerment through volunteer service, grassroots innovation, and inclusive skills development. His ongoing efforts support marginalised groups, rural enterprises, and small-scale innovators through the following initiatives:

- KwaZulu-Natal Society for the Blind
  Spearheaded a collaborative project to design and prototype an electronic walking aid (smart stick) to enhance mobility for visually impaired persons. The initiative promotes inclusive assistive technologies using low-cost embedded systems.
- Prince Mshiyeni Memorial Hospital – MoU-Based Technical Support
  Entered into a formal agreement with the hospital to diagnose, repair, and maintain essential medical and electrical equipment, thereby improving access to functioning healthcare infrastructure in resource-constrained environments.
- Let's Fix It – Community Empowerment & Technical Skills Club *(Founder)*
  Founded this volunteer-based initiative to build technical capacity among underprivileged youth and local artisans by offering:
    - Repair and refurbishment of home and electronic appliances (e.g., TVs, laptops, cellphones, stoves, geysers, washing machines)
    - Solar panel installation for off-grid households

    - Hands-on skills training in electrical wiring, maintenance, and basic electronics
    - Donation of refurbished IT equipment to learners and micro-businesses
- Support for Elim Old Age Home & Elim Prayer Chapel
  Regular contributor and technical volunteer, providing maintenance services, IT support, and infrastructural improvements to enhance the quality of life for elderly residents and their caregivers.
- Academic and Career Mentorship Programme
  Runs mentorship workshops and one-on-one coaching for academically talented but disadvantaged students, focusing on career guidance, postgraduate funding opportunities, and research skill development.
- Smart Farming Support for Local SMMEs and Cooperatives
  Provides technical support and capacity building to rural farmers and agri-SMMEs, including:
    - Training in the use of agricultural drones, IoT-based environmental sensors, and precision farming tools
    - Guidance on digital platforms for crop monitoring and yield forecasting
    - Advisory support in building community-based agritech solutions for irrigation, soil testing, and weather monitoring

TEACHING PHILOSOPHY

The quote from Wislawa Szymborska, the 1996 Nobel Prize winner, resonates deeply with me: "There is, has been, and will always be a certain group of people whom inspiration visits. It's made up of all those who've consciously chosen their calling and do their job with love and imagination…. Their work becomes one continuous adventure as long as they manage to keep discovering new challenges in it." Why do I teach? Like Szymborska, I believe teaching is my chosen calling, one I undertake with love and imagination. I see no end to improvement, no arrival, no completion. I strive to be that teacher who, even after decades in the classroom, leaves each session reflecting on how the next might be better, how to more effectively engage and inspire my students. In these statements lie my core beliefs and philosophy of teaching and learning. Teaching is an ongoing adventure, where

continuous discovery and embracing new challenges are essential. My goal is to inspire and engage my students, fostering an environment where both they and I can grow and thrive.

RESEARCH PHILOSOPHY

Albert Einstein once said, "If we knew what it was we were doing, it would not be called research, would it?" This quote perfectly encapsulates the essence of my research philosophy. 8 As an engineer, researcher, and academician, I am fascinated by the significant contributions researchers make to technological advancements in telecommunications, healthcare, computing, space exploration, and society at large. I firmly believe that technical research is a powerful driver of economic development for any nation. Inspired by Einstein's words, I embrace the journey into the unknown through research. It is through this exploration and discovery that we transform the unknown into knowledge, propelling innovation and progress in our fields.

RESEARCH INTERESTS

1. Artificial Intelligence, Machine Learning & Deep Learning Applications

- Human activity recognition, biomedical imaging, sentiment and event detection, and anomaly prediction
- Transfer learning, ensemble models, and generative models (e.g., GANs, VAE, StyleVGG, CycleGAN)
- Transformer-based architectures for NLP and Word Sense Disambiguation in low-resource African languages
- Hybrid LSTM–CNN architectures for medical diagnosis and behavioural analytics
- Domain adaptation and transfer learning for cross-subject EEG and signal classification

2. Wireless, Optical, and Satellite Communication Engineering

- Radio frequency propagation modeling: rain attenuation, cross-polarisation discrimination, and refractivity studies
- Advanced FSO/RF hybrid system modelling under atmospheric impairments (fog, turbulence, rain, mobility)
- Reconfigurable Intelligent Surfaces (RIS) for cooperative relay networks and 6G systems
- UAV-assisted and RIS-aided security performance in smart grid and wireless energy harvesting scenarios
- Channel modelling and simulation for mmWave, Ka/V bands, and terrestrial–satellite integration

3. Renewable Energy Systems & Smart Grid Integration

- PV, wind, and hybrid system modelling for off-grid and telecommunication applications
- Demand-side management (DSM), fault detection in PV modules using vision-based systems
- Renewable energy optimization for vaccine cold storage and IoT-enabled load management
- MPPT tracking algorithms, battery storage planning, and AI-driven renewable resource forecasting

4. Computer Vision and Intelligent Systems

- 2D-to-3D image reconstruction, object detection (YOLO v5–v9), instance segmentation
- Plant disease identification, livestock monitoring, pothole detection, and smart waste bin systems
- Cloud-based license plate recognition and access control automation
- SAM-enabled image enhancement pipelines for fault analysis in agriculture and renewable systems

5. Communication Networks, IoT & Edge Computing

- Spectrum optimization, energy-efficient routing, and vehicular ad hoc networks (VANETs)
- Internet of Remote Things (IoRT), satellite-GEO systems, and adaptive scheduling algorithms
- Smart aquaponics, remote weather monitoring, and UAV-based inspection frameworks
- Fog–cloud hybrid architectures for smart farming and rural connectivity

6. Electromagnetic Compatibility & Radio Engineering

- EMC/EMI design and analysis for satellite, radar, industrial, and domestic systems
- Advanced MIMO techniques, Radio-over-Fibre systems, and cognitive radio networks
- Radar reflectivity and isotherm height prediction models for SHF/EHF propagation
- Synthetic storm and symbolic regression models for path loss prediction

7. Embedded Systems, Robotics & Remote Engineering

- IoT-integrated embedded control systems using Raspberry Pi, Arduino, STM32
- Drone-based image acquisition for crop/forest analysis, livestock tracking, and security surveillance
- Smart mobility aids for the visually impaired (e.g., Smart Stick, Smart Hat)
- Virtual labs, remote robotics simulation, and human-robot interaction design

8. Computational Intelligence in Finance and Engineering

- Financial distress prediction using hybrid ML models (GA–LSTM, ANN–PCA)
- Time series forecasting for solar generation, rain attenuation, and market behaviour
- Metaheuristics and optimisation strategies in FIR filter design and energy systems

- Credit scoring and bankruptcy modelling using advanced deep learning techniques

9. Societal Impact Research

- Low-cost ICT and AI solutions for underserved rural communities
- Smart farming systems and agri-voltaic systems for sustainable agriculture
- Inclusive digital education tools and LMS innovations for remote and hybrid learning
- AI governance, data privacy, and legal-tech convergence (aligned with LLB studies)

RESEARCH & PROJECT FUNDING PORTFOLIO

RESEARCH & PROJECT FUNDING PORTFOLIO

Total Secured Funding (ZAR): **R94,222,765.76**
Estimated USD Equivalent: **$5,013,520.32** *(@ R18.79/USD average exchange rate)*

1. Research Chair & Postgraduate Support (MICT SETA)

- **4IR Research Chair – LMS Project:** R1,980,000
- **Career Hub App Development:** R1,980,000
- **E-Learning App Development:** R1,980,000
- **Postgraduate Support (13 students):** R1,170,000
- **Top-Up Bursaries:** R27,965.76
- **Training & Capacity Development for LMS Systems:** R1,980,000
- **Postgraduate Support (17 students):** R1,530,000

Subtotal: R10,647,965.76

2. Work-Integrated Learning (WIL) Funding

BANKSETA (2017–2023)

- R8,820,000 – 200 Learners (2017)
- R4,410,000 – 100 Learners (2018)
- R3,300,000 – 50 Learners (2019)
- R6,844,200 – 100 Learners (2021)
- R5,682,600 – 82 Learners (2023)

MICTSETA (2019–2024)

- R16,560,000 – 300 Learners (2019)
- R3,500,000 – 50 Learners (2021)
- R2,100,000 – 30 Learners (2023)
- R1,400,000 – 20 Learners (2023)
- R1,400,000 – 20 Learners (2024)
- R1,472,000 – Internship Support for 20 Learners (2024)

Subtotal: R55,488,800

3. Innovation & Seed Funding (TIA, GIZ, NRF)

- **Vehicle Theft Detection using AI (TIA):** R150,000
- **Initial Research Kickstart (TIA):** R150,000
- **Energy Efficient Lighting Tools (GIZ–SAGEN):** ~R2,000,000
- **Residential Load Application (GIZ–SAGEN):** Included above
- **National Equipment Programme – mmWave System:** R5,200,000
- **Emerging IIoT Lab Setup (PTC & Partners):** R700,000

Subtotal: R8,200,000

4. Infrastructure & High-End Equipment

- **EMC/EMI Testing Facility (MUT):** R5,000,000+
- **Wind Turbine Donation (eThekwini Municipality):** R120,000

Subtotal: R5,120,000

5. NEW AgriSETA Funding (2024–2026)

- **Drone Pilot & Chemical Spraying Skills Programme (100 Learners)**
  Approved Amount: R12,430,000
  Project Ref: PS25TUT11
  Duration: 01 April 2025 – 30 June 2026

Summary

Category	ZAR	USD ($)
Research Chair & PG Support	R10,647,965.76	~$566,652.79
WIL Funding (MICTSETA & BANKSETA)	R55,488,800.00	~$2,953,500.27
Innovation & Seed Fund (TIA, GIZ, NRF)	R8,200,000.00	~$436,610.96
Infrastructure & Equipment	R5,120,000.00	~$272,646.07
AgriSETA Drone Training Programme	R12,430,000.00	~$784,110.23
Total Secured Research/Project Funding	**R94,222,765.76**	**~$5,013,520.32**

LEADERSHIP AND MANAGEMENT ROLES

Assistant Dean: Industry Liaison, Special Projects, and Work Integrated Learning
Faculty of Information and Communication Technology, Tshwane University of Technology (TUT), Pretoria, South Africa
February 2025 – Present

- Spearheading strategic academic-industry partnerships to enhance graduate employability, research impact, and innovation ecosystems.
- Leading national skills development programmes, including drone training, digital agriculture, and AI-infused curriculum initiatives.
- Overseeing faculty-wide Work-Integrated Learning (WIL), external stakeholder engagement, and high-impact special projects with SETAs, industry, and public sector entities.

MICTSETA Research Chair in 4IR Skills Development

Tshwane University of Technology (TUT), Pretoria, South Africa

2022 – Present

- Leading the national MICTSETA-funded Research Chair on 4IR Skills Development.
- Overseeing strategic research, postgraduate student mentorship, and the development of integrated platforms such as Learning Management Systems (LMS), Career Hubs, and E-Learning solutions.
- Develop and design curriculum and skills programmes/qualifications in 4IR across multi-domains.

Research Lead: AI in Agriculture – National AI Institute Collaboration

Tshwane University of Technology (TUT), Pretoria, South Africa

2023 – Present

- Serving as principal investigator in AI-Driven Smart Agriculture under the National Artificial Intelligence Institute.
- Driving applied AI research projects for precision agriculture, farm automation, food security, and community-centred agri-tech solutions.
- Supporting SMMEs and rural innovation through field-based AI deployments and drone-integrated platforms.

Head of Department: Computer Systems Engineering

Tshwane University of Technology (TUT), Pretoria, South Africa

April 2017 – January 2025

- Provided academic and operational leadership, including curriculum renewal, faculty development, and programme accreditation.
- Established the Emerging IIoT Laboratory and significantly expanded research in embedded systems, AI, and communication networks.
- Secured external funding exceeding R20 million from bodies such as MICTSETA, TIA, BANKSETA, and GIZ.

Acting/Head of Department: Electrical Engineering
Mangosuthu University of Technology (MUT), Durban, South Africa
2012 – March 2016

- Managed programme delivery, institutional accreditation readiness, and stakeholder partnerships.
- Established the first EMC/EMI laboratory in the institution and launched advanced communication systems training.

Faculty Research Chair (Engineering Faculty)
Mangosuthu University of Technology (MUT), Durban, South Africa
2012 – March 2017

- Oversaw the faculty's strategic research agenda, postgraduate programme growth, and SETA-linked research initiatives.
- Elevated the research profile of the faculty through local and international collaborations and academic publishing.

Founding Research Leader: Radio Access Network and Rural Communication (RAN-RC) Group
MUT, Durban, South Africa
2012 – March 2017

- Founded and led a flagship research unit addressing rural and last-mile communication systems through millimetre-wave, optical, and wireless network innovations.
- Conducted government-funded field trials and policy-shaping pilot studies in underserved areas.

Managing Director: West Wood Industrial Technology (Nigeria, South Africa & USA)
2016 – Present

- Founder and MD of a global engineering firm operating in industrial automation, oil and gas, and agricultural technology.

- Oversees strategic innovation projects, system integration, and global partnerships.

Programme Evaluator: Council on Higher Education (CHE), South Africa
2018 – 2023

- Appointed as a peer reviewer for national programme accreditation and quality assurance in higher education, specialising in Engineering and ICT disciplines.

CAREER HISTORY-EXPERIENCE

Assistant Dean: Industry Liaison, Special Projects, and Work Integrated Learning

Faculty of Information and Communication Technology, Tshwane University of Technology (TUT)
February 2025 – Present

- Provide strategic academic-industry leadership across the faculty, managing external partnerships, Work-Integrated Learning (WIL), and national special projects.
- Coordinate high-impact national programmes in drone training, AI-infused agriculture, and digital skills development for underserved communities.
- Spearhead SETA collaborations, curriculum innovation, and talent pipelines for 4IR-aligned professions.

Research Chair – Fourth Industrial Revolution (4IR)

MICTSETA & Tshwane University of Technology (TUT)
2022 – Present

- Oversee multimillion-rand funded research and innovation projects including LMS, Career Hubs, and E-Learning Platforms.

- Lead postgraduate research training and digital solutions development across ICT, AI, and Data Engineering domains.
- Coordinate strategic outputs and capacity-building aligned with national digital transformation priorities.

Research Lead – Artificial Intelligence in Agriculture

National AI Institute & Tshwane University of Technology (TUT)
2023 – Present

- Direct interdisciplinary research integrating AI, IoT, and precision agriculture to support SMMEs and food security initiatives.
- Supervise funded postgraduate projects on AI-based crop monitoring, yield prediction, and UAV-assisted smart farming solutions.
- Engage with stakeholders from academia, government, and agri-tech industries to pilot scalable innovations.

Head of Department: Computer Systems Engineering

Tshwane University of Technology (TUT), Pretoria
April 2017 – January 2025

- Led department through strategic curriculum reforms, ECSA accreditations, and academic excellence in AI, robotics, and embedded systems.
- Established multiple postgraduate programmes and advanced laboratories including the Emerging IIoT Lab.
- Secured and managed over R46 million in funding for WIL, research, and capacity-building projects.
- Contributed over 75% of annual faculty research outputs and mentored a majority of academic staff to postgraduate qualification completion.

Acting/Head of Department: Electrical Engineering

Mangosuthu University of Technology (MUT), Durban
2012 – March 2016

- Championed curriculum modernization and ECSA programme accreditations across multiple engineering specializations.
- Established new laboratories (e.g., Radio Engineering, Power Systems) and pioneered industry collaborations with ESKOM, South African Navy, and TRANSNET.
- Attracted over R7 million in infrastructure and training equipment for academic improvement and student support.
- Initiated mentorship programmes and skills development strategies tailored to departmental needs.

Faculty Research Chair – Engineering Faculty

Mangosuthu University of Technology (MUT), Durban
2012 – March 2017

- Oversaw faculty-wide research development strategies, postgraduate funding coordination, and research output expansion.
- Led successful funding applications and established national/international collaborations in engineering innovation and wireless systems.

Founding Research Leader: Radio Access Network and Rural Communication (RAN-RC)

MUT, Durban, South Africa
2012 – March 2017

- Initiated a research niche focused on advanced wireless, millimetre-wave, and fibre-optic communication systems for rural connectivity.
- Supervised postgraduate students and published significant research outputs in high-impact journals and conferences.

Managing Director: West Wood Industrial Technology (Nigeria, South Africa & Canada)

2016 – Present

- Founded and manage a multinational firm offering services in oil & gas, agriculture, and industrial automation.
- Oversee system design, product innovation, and global technical operations.

Programme Evaluator

Council on Higher Education (CHE), South Africa
2018 – 2023

- Evaluated and reviewed engineering and ICT academic programmes for quality assurance and accreditation purposes.

HONOUR, AWARD AND RECOGNITIONS

- **Top 500 African Researchers (2021)**
  Recognised among the continent's leading researchers for scholarly output and impact.
  View Article
- **Senior Researcher of the Year – Tshwane University of Technology (TUT)**
  2020 and 2018
  Acknowledged for sustained research excellence and high-impact outputs.
- **Senate Research Excellence Award – TUT**
  2016
  Conferred by the University Senate for significant scholarly contributions and national visibility.
- **Most Outstanding Researcher – Faculty of Engineering (TUT)**
  2016, 2014, 2012
  Recognised for outstanding leadership in research development, output generation, and postgraduate supervision.
- **Vice-Chancellor's Teaching Excellence Award – TUT**
  2015

Honoured for innovative teaching practices, learner engagement, and curriculum transformation.

- **BIARI Alumnus – Brown International Advanced Research Institute**
  Brown University, Providence, USA – June 2013
  Selected to participate in a global interdisciplinary fellowship programme on development, policy, and academic leadership.
- **Best Paper Award – 2nd International Conference on Applied and Theoretical Information Systems Research**
  Taipei, Taiwan – December 2012
  Joint recipient of best paper award for novel contributions to wireless systems and optimisation.

- **Best Engineering Mentor – University of KwaZulu-Natal (UKZN)**
  2006 & 2007
  Recognised for exceptional mentorship and student development in engineering education.

SCHOLARLY ACTIVITIES

- **External Examiner Roles**
  - *University of Mauritius* – Undergraduate and Postgraduate Programmes
  - *University of KwaZulu-Natal (UKZN)*
  - *Durban University of Technology (DUT)*
  - *University of South Africa (UNISA)*
  - *Tshwane University of Technology (TUT)*
- **Guest Speaker**
  - *2021 National Skills Conference, South Africa*
    Delivered a keynote address on emerging skills for the Fourth Industrial Revolution.
    Read Article
- **Conference Leadership & Technical Roles**

- **Co-Chair** – *ICARTI 2021* (International Conference on Artificial Intelligence and its Applications)
  Conference Link
- **Technical Committee/Organising Committee Member** for various international conferences:
  1. *ICABCD 2020* – International Conference on Artificial Intelligence, Big Data, Computing and Data Communication System
  2. *ICPRE 2020* – International Conference on Power and Renewable Energy
  3. *SPIN 2014* – International Conference on Signal Processing and Integrated Networks, Noida, India
  4. *SATNAC 2014* – Southern Africa Telecommunication Networks and Applications Conference
  5. *IDETIC 2017* – Conference on ICT and Engineering Education Innovation
  6. *IMITEC 2020* – International Conference on Mechatronics and Intelligent Technology

- **Technical Reviewer for Leading Journals**
  Regular reviewer of articles in high-impact peer-reviewed journals:
  - *International Journal of Communication Systems* – Wiley
  - *Photonics* – MDPI
  - *Advances in Space Research* – Elsevier
  - *Ecological Informatics* – Elsevier
  - *Ecological Indicators* – Elsevier
  - *Optics* – Elsevier
  - *Optik: International Journal for Light and Electron Optics*
  - *IEEE Transactions on Cognitive and Developmental Systems*
- **Research Funding & Project Evaluation**
  - *Technical Reviewer for Swiss National Science Foundation (SNSF)* – Project ID: IZLSZ2_170863, Year: 2016
- **Standard-Setting & Benchmarking Contributions**

- Member, *National Benchmark Test (NBT)* and *HESA Panel* on Quantitative Literacy Diploma Standards (2012)

- **Professional Associations & Conference Contributions**
  - *Technical Programme Committee Member*:
    - SATNAC 2014 (co-hosted by Telkom and South African telecoms industry)
    - IEEE ICAST 2013 & 2014 – International Conference on Adaptive Science & Technology
    - SPIN 2014 – Signal Processing and Integrated Networks

COURSES TAUGHT: INTERNAL AND EXTERNAL

Summary:

Extensive teaching experience across undergraduate, BTech/Honours, and Master's programmes at three South African universities: **University of KwaZulu-Natal (UKZN)**, **Mangosuthu University of Technology (MUT)**, and **Tshwane University of Technology (TUT)**. This includes both theory and laboratory components, with a strong contribution to curriculum design, course material development, and innovation in delivery.

A. Mangosuthu University of Technology (MUT)

Undergraduate and Postgraduate Courses Taught:

- Information Technology Electronics II & III
- Radio Engineering III
- Mechanical Technology III (Mechatronics)
- Robotics III *(Developed course material and practical manuals)*
- Digital Systems I & II
- Electronics I, II & III *(Developed course material and facilitated lecturer onboarding)*
- Introduction to Computers
- Network Systems II & III

- Microprocessors III
- Project IV
- Master's Bridging Modules
- Electrical Engineering Principles and Power Electronics

B. University of KwaZulu-Natal (UKZN)

Taught between 2007 – 2012 across undergraduate and postgraduate levels:

- Electrical Engineering Principles
- Physics for Engineering and Science
- Engineering Mathematics
- Microwave Engineering

C. Tshwane University of Technology (TUT)

Current Teaching Portfolio

Postgraduate Courses (Master's Level):

- Data Science and Machine Learning
- Internet of Things (IoT)
- Simulation and Modelling
- Advanced Artificial Intelligence
- Advanced Emerging Technologies *(Computer Vision focus)*

Undergraduate Courses:

- Project Design (BTech)
- Engineering Design (Advanced Diploma)
- Artificial Intelligence and Machine Learning (Advanced Diploma)
- Emerging Technologies *(Image Processing and Computer Vision)*

POSTGRADUATE COURSES TAUGHT

- Advanced Wireless Communication

- Simulation and Modelling
- Emerging Technology (Internet of Things)

INDUSTRIAL PROJECT: ONGOING/COMPLETED

As a Professor of Computer Engineering, Data Scientist, and Research Leader, I have led or supervised numerous interdisciplinary projects across domains such as smart agriculture, renewable energy, autonomous systems, AI applications, and ICT innovations. These projects are carried out in collaboration with SETAs, government agencies (e.g., SANEDI, DOD), private sector partners, and student innovators.

Smart Agriculture, Food Systems, and Automation

- Design and Implementation of Agricultural Spraying Drone
- AgroFace – Agricultural Social Network for Farmer Collaboration and Advisory
- Ubuntu Basket – Agricultural E-commerce Platform for Smallholder Farmers
- Computer Vision-Based Fruit Quality Management System
- AI-Driven Weed and Disease Detection System *(in development)*
- Drone-Assisted Soil and Crop Monitoring using Hyperspectral Imaging
- Livestock Movement Monitoring using AI and Edge IoT Cameras *(pilot testing)*
- Autonomous Seeding and Fertilisation Robot *(ongoing prototyping)*
- Remote Irrigation Monitoring System using GSM & IoT

Energy Systems and Green Technology

- Hybrid Renewable Energy Systems for GSM Base Stations
- Zero-Waste Green Energy Generation System
- Energy Management Systems (SANEDI & DOD, GIZ-Funded)
- Smart Meter KOM: Low-Cost Wireless Power Metering Sensors
- Simulation-Based Renewable Energy System (LabView, MATLAB/Simulink)
- Intelligent Control of Parabolic Trough Solar Collectors
- Design and Implementation of an Intelligent Wireless Street Lighting System

AI, Robotics, and Assistive Technology

- Brain-Controlled Robot System (EEG/BCI-Driven)

- Design and Implementation of a Flying Car (Prototype Stage)
- GANs-Based 3D Reconstruction for Crime Scene Analysis
- Human Gesture Relay Systems via Computer Vision Techniques
- AI-Powered Walking Aid for the Visually Impaired (with KZN Society for the Blind)
- AI-Based Fall Detection System for Elderly Care Homes *(development ongoing)*
- Speech-to-Command Home Automation for People with Disabilities

ICT and Industry 4.0 Solutions

- MICT SETA LMS Portal System – National Skills Platform
- TUT Student Assistant Chatbot (AI/NLP-Based)
- Design and Implementation of Smart Home Prototypes
- Wireless-Based Electrical Device Control System
- PC-Based Substation Monitoring Using RF Communication
- Automated Power Meter Reading via GSM Network
- IoT-Based Smart Factory Monitoring and Predictive Maintenance Platform
- PC-Based Departmental Digital Signage and Monitoring System

Computer Vision and Immersive Technologies

- Computer Vision-Based Car Security and Theft Prevention System
- Augmented Gamification of Science Subjects (e.g., Physics in AR/VR)
- Vision-Based Gaming Applications (Gesture-Controlled Interfaces)
- 3D Facial Recognition-Based Biometric Access Control *(in testing)*
- AI-Driven Sign Language Recognition System for the Hearing Impaired

ESTERBLISHED LABORATORY

As a strategic academic leader and research chair, I have spearheaded the design, establishment, and equipping of cutting-edge engineering laboratories that support teaching, research, innovation, and industry collaboration in line with 4IR technologies.

Established Laboratories at Tshwane University of Technology (TUT)

Laboratory	Focus Area	Date Established
Fourth Industrial Revolution (4IR) Innovation Lab	AI, ML, IoT, Robotics, Smart Systems	**2021–2022**
Drone Technology Laboratory	UAV development, Aerial Imaging, Smart Agriculture	**2021–2022** *(ongoing)*
Emerging Technologies Laboratory	Computer Vision, AR/VR, AI, IoT, Data Science	**2018**
Engineering Innovation Labs (3 new labs)	Teaching & Research Support in Core Engineering	**2018**
Electromagnetic Compatibility (EMC/EMI) Laboratory	Signal Integrity, Electromagnetic Testing	**March 2016–Present**
Renewable Energy Laboratory	Solar, Hybrid Systems, Power Electronics	**February 2016**
Routing, Switching & Networking Laboratory	Cisco CCNA/CCNP, Network Simulations	**December 2015**
Radio Propagation and Wireless Communications Lab	5G, FSO, mmWave, Satellite, RF Signal Analysis	**March 2015**
Mechatronics Laboratory	Robotics, Actuation Systems, Intelligent Control	**January 2016**
Workshop Practice Laboratory	Hands-on Mechanical & Electronic Skill Development	**February 2014**

MANUSCRIPTS/CONFERENCE AND THESIS REVIEWED/EXAMINED

As a recognised academic and research leader, I have served extensively as an external examiner, thesis reviewer, conference peer reviewer, and academic assessor at both national and international levels across diverse disciplines,

including Artificial Intelligence, Communication Engineering, Data Science, Wireless Networks, and ICT for Development.

Thesis Examination & Academic Assessment

- **PhD Thesis Examiner**, *Anna University, Chennai, India – Indoor and Outdoor Obstacle Detection Using Computer Vision for Visually Impaired*, 2020.
- **PhD Thesis Examiner**, *University of South Africa (UNISA) – Swarm Intelligence for Mobile Ad Hoc Networks*, 2020.
- **MEng Thesis Examiner**, *Durban University of Technology – Privacy in D2D Communication in IoT Networks*, 2021.
- **MSc Thesis Examiner**, *Botswana International University of Science and Technology (BIUST) – Setswana Grammar Checker using LSTM-RNNs*, 2021.
- **MSc Thesis Examiner**, *University of KwaZulu-Natal (UKZN) – Few-Shot Learning for Mapless Navigation using Deep Q-Learning*, 2022.
- **MTech Thesis Examiner**, *Vaal University of Technology (VUT) – RFID-based Library Inventory System*, 2020.
- **MTech Thesis Examiner**, *VUT – Personal Health Data Monitoring System*, 2020.
- **MSc Thesis Examiner**, *Makerere University, Uganda – Energy Optimization in LTE/LTE-A Networks*, 2020.
- **MTech Thesis Examiner**, *TUT – Tuberculosis Prevention Decision Support System for HIV Patients*, 2017.
- **MTech Thesis Examiner**, *DUT – Congestion Minimization in OBS Networks*, 2017.
- **Assessor for Professorial Appointments**, *Covenant University, Nigeria*, 2021 (2 cases).

Peer Review of High-Impact Journal Manuscripts

- **Advances in Space Research (Elsevier)**
- **Progress in Electromagnetics Research (PIER)**
- **Journal of Atmospheric and Solar-Terrestrial Physics (Elsevier)**

- **Ecological Informatics (Elsevier)**
- **Optics & Optik Journals (Elsevier)**
- **Photonics (MDPI)**
- **IEEE Transactions on Cognitive and Developmental Systems**
- **International Journal of Communication Systems (Wiley)**
- **Ecological Indicators (Elsevier)**
- **Indian Journal of Radio & Space Physics (IJRSP)**
- **Journal of the Chinese Institute of Engineers**

Conference Paper Reviews and Committee Roles

- **SATNAC** (2013–2014): Technical Programme Committee (TPC) Member
- **ICAST (IEEE-CSIR)** (2013–2014): TPC Member and Reviewer
- **SPIN (India)** 2014: TPC Member
- **PIERS (Progress in Electromagnetics Research Symposium)**: Multiple papers reviewed across 2012–2016
- **ICARTI (International Conference on AI and its Applications)**, 2021: Co-Chair
- **ICABCD**, **IMETIC**, **IDETIC**, **ICPRE**, and others: Technical Review Board & Session Chair

Select Peer-Reviewed Conference/Journal Papers Evaluated

- *Rain Attenuation Models and Radioclimatic Data Studies (PIER, AFRICON)*
- *Satellite and Optical Fiber Communications under Rain Conditions (PIER, Elsevier)*
- *Smart Grid Optimization and IoT-Based Monitoring Systems*
- *AI-based Disease Diagnosis and Decision Support Tools (SATNAC, ICAST)*
- *Mobile Transaction Fraud Detection Systems (SATNAC 2014)*
- *Design of Location-Based and Health Monitoring Systems*
- *Quantum Cryptography Applications in Satellite Security (ICAST 2013)*
- *RF and Rain Attenuation Modeling in West and Southern Africa (Multiple Journals)*

RESEARCH COLLABORATIONS

I have established and sustained extensive national and international research collaborations across Africa, North America, and Europe. These collaborations span advanced areas in **communication systems**, **AI-driven solutions**, **renewable energy**, **embedded systems**, and **radio propagation technologies**, leading to joint research outputs, grant-winning proposals, and postgraduate supervision.

South Africa

1. University of KwaZulu-Natal (UKZN), Durban

- **Prof. T.J. Afullo**:
  - Powerline Communication
  - High-Frequency Radio Propagation
  - Free Space Optical (FSO) Communication
  - Satellite Communication
  - Electromagnetic Compatibility & Interference (EMC/EMI)
- **Prof. T. Walingo**:
  - MIMO Applications at Microwave and mmWave Bands
  - Free Space Optical Communication
  - Satellite and Wireless Communication
  - Embedded Systems and Electronic Circuit Design
- **Prof. Dr. Viranjay M. Srivastava**:
  - Free Space Optical Communication
  - Microelectronics, VLSI, RF CMOS Design

2. Durban University of Technology (DUT), Durban

- **Prof. I.E. Davidson**:
  - Smart Grids, Modern Electric Power Systems
  - Renewable Energy and Clean Energy Systems
- **Prof. O. Olugbara**:

    - Artificial Intelligence and Expert Systems
- **Dr. O. Sokoya**:
    - MIMO Systems in mmWave and Microwave Communications
- **Prof. Nleya**:
    - Radio-over-Fiber Communication Systems
- **Mr. Timothy Akindeji**:
    - Renewable Energy Systems and Power Modelling

3. University of Pretoria (UP)

- **Prof. T. Stander**:
    - mmWave Microelectronics for Terrestrial Wireless
    - Cryogenic Microelectronics for Radio Astronomy
    - Radiation Damage in Microelectronic Devices

4. University of Johannesburg (UJ)

- **Prof. S. Sinha**:
    - Collaborative research in Engineering Education, RF Systems

Nigeria

5. Federal University of Technology, Akure (FUTA)

- **Prof. S.J. Ojo**:
    - Radio Propagation and Satellite Communications
    - Co-supervision of postgraduate students

United States

6. Tennessee Technological University, Cookeville – Department of Electrical & Computer Engineering

- **Prof. Joseph Olunfemi Ojo**:
    - Power Systems Optimization
    - Renewable Energy Integration

7. University of California, San Diego – Department of Electrical and Computer Engineering

- **Prof. Boubacar Kanté (Qualcomm Faculty Fellow)**:
  - Metamaterials
  - Nano-Photonics
  - FSO and mmWave Communications

8. Norfolk State University – Department of Computer Science

- **Prof. Isaac Osunmakinde**:
  - AI for Development
  - Machine Learning and Predictive Analytics

Canada

9. Memorial University of Newfoundland – Faculty of Engineering and Applied Science

- **Prof. Telex Magloire N. Ngatched, PhD, P.Eng., SMIEEE**:
  - Wireless Communication Systems
  - Channel Modeling and 5G/6G Propagation Studies
  - Collaborative research in Hybrid FSO-mmWave Links

SUPERVISION AND POSTGRADUATE MENTORSHIP

SUPERVISION RECORD

Prof. Pius A. Owolawi
Assistant Dean: Industry Liaison, Special Projects, and Work Integrated Learning
Tshwane University of Technology

A. POSTDOCTORAL FELLOWS – COMPLETED SUPERVISION

No.	Name	Institution	Research Area	Duration

1	Dr. J.S. Ojo	Mangosuthu University of Technology	Radio Access Networks and Rural Communications	Completed (2 years)
2	Dr. T. Mapayi	Tshwane University of Technology	Intelligent Systems	Completed (3 years)
3	Dr. K. Odeyemi	Tshwane University of Technology	Optical Wireless Communications	Completed (2 years)
4	Dr. G. Aiyetoro	Tshwane University of Technology	5G Networks and Satellite Communication	Completed (3 years)
5	Dr CB Asaju	Tshwane University of Technology	Artificial Intelligence and Computer vision in Agriculture	Completed (1year)
6	Dr Yves Matanga	Tshwane University of Technology	Artificial Intelligence and Optimization	Completed (1 year)
7	Dr Y.T Lawa	Tshwane University of Technology	Advanced Deep Learning for Predication of Atmospheric Visibility and Fog-Induced Attenuation for FSO Communication Links	Completed (1 year) + Continue 2nd Year
8	Dr R.W.Bello	Tshwane University of Technology	Artificial Intelligence, ML and Computer Vision	Completed (1 year) + Continue 2nd Year
9	Dr Clifford Maswanganyi	Tshwane University of Technology	EEG-Based BCI for Robotic Arm Control	Active 1st Year
10	Dr RO Ogundokun	Tshwane University of Technology	Artificial Intelligence, ML and Computer Vision	Active 1st Year
11	Dr. O.A. Layioye	Tshwane University of Technology	Advanced Deep Learning for Predication of Atmospheric Visibility and Fog-Induced Attenuation for FSO Communication Links	Active 1st Year
12.	Dr. Dorcas Oladayo Esan	Tshwane University of Technology	Artificial Intelligence, ML, Generative AI and Computer Vision	Active 1st Year
13	Dr A.Adisa	Tshwane University of Technology	Artificial Intelligence, ML, Generative AI and Computer Vision	Active 1st Year

B. MASTER'S STUDENTS – GRADUATED

Total Graduated Master's Students Supervised: 29 (DUT, UKZN, TUT, UNISA, FUTA)

Selected Graduated Students and Topics

No.	Name	Institution	Thesis Title	Year
1	Kolawole O.	UKZN	Seamless Integration of Fibre-over-Wireless	2018

	Olanrewaju		using Advanced Modulation Techniques	
2	Oludayo I. Elujide	DUT	Dynamic Optimization Scheme for Handover in LTE	2015
3	Ogunmodele H. Ayodeji	UKZN	4×4 MIMO-OFDM Optical Fibre-over-Wireless for High Capacity Access Networks	2018
4	Ajewole B. Doyinsola	UKZN	Coded MIMO FSO Communication over Atmospheric Turbulence	2019
5	Ayeni O. Olawale	FUTA	Modulation Integration with Spatial Diversity in Free Space Optical Channels	2017
6	Adetunji R. Moses	FUTA	Statistical Modelling of Fading in FSO Links under Atmospheric Turbulence	2018
7	Oyedele O. Muiz	TUT	Control Strategy of Hybrid Green Energy Systems for Base Stations	2018
8	Atoye A. Moses	TUT	Renewable Energy-Based Microgrid Systems for Green Telecom in Southern Nigeria	2018
9	Adegbindin I. Abolaji	UNISA	Intelligent Control Network for QoS in Rain-Impaired Wireless/Satellite Networks	2017
10	Akinrinade O.B.	TUT	Detection of Skin Cancer Using Multi-Stage Graph-Cuts	2020/21
11	Khoza E.	TUT	Intelligent Traffic Optimization in VANETs	2020
12	Mamabolo E.	TUT	Heart Disease Prediction Using Classification Techniques	2020
13	Clifford Maswanganyi	TUT	EEG-Based BCI for Robotic Arm Control	2020
14	Sempe L.	TUT	Modelling and Optimisation of Hybrid Microgrid for LTE Base Stations	2021
15	Fatoki O.O.	TUT	Optic Disc Segmentation for Glaucoma Diagnosis	2022
16	Mpoporo L.J.	TUT	QoS Management in Satellite Links at High Frequency	2021
17	Machele I.L.	TUT	IoT-Based Remote Patient Monitoring Systems	2021
18	Olowoyo B.	TUT	Smart AI System for Computer Virus Detection	2021
19	Adedoja A.O.	TUT	Deep Learning for Plant Disease Recognition	2021
20	Mogale M.	TUT	POS Tagging for Setswana using Genetic Algorithms	2023
21	Oladosu G.O.	TUT	Cross-Layer Handover Algorithm in VANETs	2023
22	Mathatho S.	TUT	IoT-Based Intelligent Safety System for Coal Mines	2024

C. DOCTORAL STUDENTS – GRADUATED

No.	Name	Institution	Thesis Title	Year
1	Dr. Kehinde Odeyemi	UKZN	Spatial Diversity & Relay-Assisted Techniques in Misaligned Turbulent FSO Channels	2018

2	Dr. Emmanuel Olurotimi	DUT	Tropospheric Attenuation Modelling along SHF/EHF Satellite Links in Subtropical Regions	2019
3	Dr. O.A. Layioye	UKZN	Fibre-over-Wireless Design and Implementation for Future Network Access	2022
4	Dr S.O. Ojo	TUT	Ensemble Forecasting of Stock Markets using LSTM and CNN	2024
5	Dr. P. S. Maswikaneng	TUT	Enhancing quality of service in free space optical wireless channels through atmospheric turbulence mitigation: A neural network-based approach	2024
6	Dr R. C. Maswanganyi	TUT	Multi-class Domain-adaptation Algorithms based on Domain Selection for EEG Classification	2024
7	Dr. A. Adisa	TUT	Deep Learning for Financial Crisis Prediction: Bankruptcy and Credit Scoring	2025
8	Dr. Dorcas Oladayo Esan	TUT	Artificial Intelligence, ML, Generative AI and Computer Vision	2025

D. CURRENT POSTGRADUATE STUDENTS – UNDER SUPERVISION

PhD (Doctor of Computing / Engineering):

Ongoing PhD/DComp Candidates

No.	Name	Institution	Qualification Name	Year Registered
1	Olulana K.G.	TUT	Doctor of Computing: Computer Systems	2025
2	Dibitso M.A.	TUT	Doctor of Computing: Computer Systems	2024
3	Mpoforo L.J.	TUT	Doctor of Computing: Computer Systems	2024
4	Folorunsho H.B.	TUT	Doctor of Computing: Computer Systems	2024
5	Esan D.O.	TUT	Doctor of Computing: Computer Systems	2023
6	Adisa J.A.	TUT	Doctor of Computing: Computer Systems	2020
7	Adebusola S.O.	TUT	Doctor of Computing: Computer Systems	2020
8	Komba M.G.	TUT	Doctor of Computing: Computer Systems	2019
9	Matondo B.S.	TUT	Doctor of Computing: Computer Systems	2018
10	Ayo A.O.	TUT	Doctor of Computing: Computer Systems	2018

11	Hlaudi Daniel Masethe	TUT	Doctor of Computing: Computer Science	2018
12	Tumelo Presley Nkgapele	TUT	Doctor of Computing: Computer Systems	2025
13	Ms G.Seme	DUT	Doctor of Computing	2021
14	Mr C.Nwange	UKZN	DEng	2021

Master's (MComp / MTech): *(Sample of over 15 active students)*

Name	Topic
Nomasotsha K	Real-Time Health Monitoring System for Clinical Data Collection
Manana M.G.	Vehicle Detection and Tracking using CNN + Pyramid Optical Flow
Motshoane K.Z.	Voice-Based Feature Detection for Visually Impaired Employees
Tshililo M.E.	Data Mining for Big Data Analytics and Smart Systems
SEKGOBELA TN	
Mapengo T.H.	Smart Garbage Classification System for Waste Management
Mahlangu T.V.	Machine Learning-Based Cyberbullying Detection in Image Captions
Motsume L.	Data Recovery in Wireless Sensor Networks for Weather Stations
Diffouo R.	Brain-Controlled Mobile Robot Implementation
Ondo E.	Green Base Station Power Management for ITE-A
Mamabolo K.E.	Fuzzy Ontology Decision Support for Heart Failure Diagnosis

Master's Graduates Supervised (Selected Highlights)

Kolawole Olanrewaju	UKZN	Seamless Integration of Fiber-over-Wireless Using Advanced Modulation	2018
Oludayo Elujide	DUT	Dynamic Optimization for Handover in LTE Networks	2015
Ogunmodele H. Ayodeji	UKZN	4×4 MIMO-OFDM Fiber-over-Wireless for High-Capacity Networks	2018
Ajewole B. Doyinsola	UKZN	Coded MIMO FSO over Atmospheric Turbulence	2019
Ayeni O. Olawale	FUTA	Spatial Diversity Modulation in FSO Systems	2017

Adetunji R. Moses	FUTA	Statistical Modeling of FSO Fading Channels	2018
Oyedele O. Muiz	FUTA	Hybrid Green Energy for Base Stations	2018
Atoye A. Moses	FUTA	Comparative Study of Renewable Micro-Grids	2018
Adegbindin I. Abolaji	UNISA	Intelligent Control Network for Rain-Impaired Satellite Links	2017
Khoza E.	TUT	Optimization for Intelligent Traffic in VANETs	2020
Mamabolo E.	TUT	Heart Disease Prediction Using Classification	2020
Maswanganyi C.	TUT	EEG-based Brain-Controlled Robotic Arm	2020
Sempe L.	TUT	Optimization of Hybrid Micro-Grid for LTE	2021
Fatoki O.O.	TUT	Optic Disc Segmentation for Glaucoma Detection	2022
Mpoporo L.J.	TUT	QoS Maintenance System for Satellite Link	2021
Machele I.L.	TUT	Smart Environments for Remote Patient Monitoring	2021
Olowoyo B.	TUT	AI for Computer Virus Detection	2021
Adedoja A.O.	TUT	Deep Learning for Plant Disease Recognition	2021

Master's – Ongoing (TUT)

B. Current Master's Candidates (Extracted from Spreadsheet)

No.	Name	Institution	Qualification Name	Year Registered
1	Nomasotsha K.	TUT	Master of Computing: Computer Systems	2025
2	Sekgobela T.N.	TUT	Master of Computing: Computer Systems	2024

3	Teffo P.N.	TUT	Master of Computing: Computer Systems	2024
4	Tshishonga A.C.	TUT	Master of Computing: Computer Systems	2024
5	Mncube T.E.	TUT	Master of Computing: Computer Systems	2024
6	Mkhonto A.V.	TUT	Master of Computing: Computer Systems	2024
7	Tshinu K.P.	TUT	Master of Computing: Computer Systems	2024
8	Seretloa J.S.	TUT	Master of Computing: Computer Systems	2023
9	Sethosa N.I.	TUT	Master of Computing: Computer Systems	2023
10	Makhorole T.S.	TUT	Master of Computing: Computer Systems	2023
11	Ojo J.	TUT	Master of Computing: Computer Systems	2022
12	Akinleye S.B.	TUT	Master of Computing: Computer Systems	2021
13	Khubeka P.P.	TUT	Master of Computing: Computer Systems	2020
14	Sefala P.N.	TUT	Master of Computing: Computer Systems	2020
15	Msiza Z.	TUT	Master of Computing: Computer Systems	2019

PUBLICATION HISTORY

https://scholar.google.com/citations?view_op=list_works&hl=en&hl=en&user=uxyoAbYAAAAJ&sortby=pubdate

2025 Publication

1. S. O. Adebusola, P. A. Owolawi, J. S. Ojo, P. S. Maswikaneng, and A. O. Ayo, "Application of principal component analysis and artificial neural networks for the prediction of QoS in FSO links over South Africa," *Results in Optics*, vol. 19, p. 100796, May 2025, Elsevier.
2. R. W. Bello, P. A. Owolawi, E. A. van Wyk, and C. Tu, "Object Detection Algorithms for Digital Imaging Applications: A Review," *IntechOpen*, Apr. 30, 2025.

3. P. A. Olujimi, P. A. Owolawi, R. C. Mogase, and E. Van Wyk, "Agentic AI Frameworks in SMMEs: A Systematic Literature Review of Ecosystemic Interconnected Agents," *Preprints*, Apr. 22, 2025. [Online]. Available: https://www.preprints.org
4. S. B. Matondo and P. A. Owolawi, "Rain attenuation modelling based on symbolic regression and differential evolution for 5G mmWave wireless communication networks," *Progress in Electromagnetics Research B*, vol. 111, pp. 1–15, Apr. 2025. [Online]. Available: https://www.jpier.org
5. H. D. Masethe, M. A. Masethe, S. O. Ojo, P. A. Owolawi, and F. Giunchiglia, "Hybrid transformer-based large language models for word sense disambiguation in the low-resource Sesotho sa Leboa language," *Applied Sciences*, vol. 15, no. 7, pp. 1–20, Apr. 2025. [Online]. Available: https://www.mdpi.com/journal/applsci
6. S. O. Adebusola, P. A. Owolawi, J. S. Ojo, and P. S. Maswikaneng, "Optimized quality of service prediction in FSO links over South Africa using ensemble learning," *Optics Communications*, vol. 579, p. 131509, Apr. 2025, North-Holland.
7. Y. B. Lawal, P. A. Owolawi, C. Tu, E. Van Wyk, and J. S. Ojo, "Analysis of cross-polarization discrimination due to rain for Earth–space satellite links operating at millimetre-wave frequencies in Pretoria, South Africa," *Atmosphere*, vol. 16, no. 3, p. 256, Feb. 2025. [Online]. Available: https://www.mdpi.com
8. N. N. Maseko, D. Enke, P. A. Owolawi, S. A. Iwarere, O. S. Oluwafemi, and J. Pocock, "The influence of gold nanoparticles addition on sugarcane leaves-derived silica xerogel catalyst for the production of biodiesel," *Gels*, vol. 11, no. 3, p. 153, Feb. 2025. [Online]. Available: https://www.mdpi.com
9. A. Biheng, C. Tu, P. A. Owolawi, D. Du Plessis, and S. Du, "Network architecture of a Fog–Cloud-based smart farming system," *IoT*, vol. 6, no. 1, p. 17, Feb. 2025. [Online]. Available: https://www.mdpi.com
10. R. W. Bello, P. A. Owolawi, E. A. van Wyk, and C. Tu, "Cattle instance segmentation by transfer learning approach using deep learning models for sustainable livestock farming," *IntechOpen*, Feb. 11, 2025. [Online]. Available: https://www.intechopen.com

11. O. B. Aborisade, J. S. Ojo, P. Owolawi, and K. D. Adedayo, "Machine learning-based prediction of path attenuation coefficient for terrestrial FSO link: Northern Cape, South Africa," in *Proc. 8th URSI-NG Annu. Conf. (URSI-NG 2024)*, Atlantis Press, 2025, pp. 199–212.

12. L. J. Mpoporo, P. A. Owolawi, and G. R. Aiyetoro, "Artificial neural networks for prediction of rain attenuation on Ku-band in South Africa," in *Proc. 8th URSI-NG Annu. Conf. (URSI-NG 2024)*, Atlantis Press, 2025, pp. 232–244.

13. A. O. Ayo, P. A. Owolawi, and J. S. Ojo, "Analysis of rain-induced attenuation observed and estimated over millimetre waves propagation links in sub-tropical region," in *Proc. 8th URSI-NG Annu. Conf. (URSI-NG 2024)*, Atlantis Press, 2025, pp. 39–50.

14. S. Chabalala, S. O. Ojo, and P. A. Owolawi, "Transfer learning for named entity recognition in Setswana language using CNN-BiLSTM model," *Int. J. Adv. Comput. Sci. Appl.*, vol. 16, no. 2, pp. 1–10, Feb. 2025.

15. C. B. Asaju, P. A. Owolawi, C. Tu, and E. Van Wyk, "Cloud-based license plate recognition: A comparative approach using You Only Look Once versions 5, 7, 8, and 9 object detection," *Information*, vol. 16, no. 1, p. 57, Jan. 2025. [Online]. Available: https://www.mdpi.com

16. K. O. Odeyemi and P. A. Owolawi, "Outage probability of reconfigurable intelligent surface assisted NOMA cooperative system over mixed FSO/RF links," in *Proc. 2025 IEEE Int. Conf. Consum. Electron. (ICCE)*, Las Vegas, NV, USA, Jan. 2025, pp. 1–6. doi: 10.1109/ICCE59767.2025.xxxxx

17. Y. B. Lawal, C. Tu, E. A. van Wyk, P. A. Owolawi, and J. S. Ojo, "Impact of rain heights on rain-induced attenuation for communication systems operating at Ka and V bands in Pretoria, South Africa," in *Proc. 2025 IEEE 15th Annu. Comput. Commun. Workshop Conf. (CCWC)*, Las Vegas, NV, USA, Jan. 2025, pp. 01111–01117. doi: 10.1109/CCWC59778.2025.xxxxx

18. R. O. Ogundokun, P. A. Owolawi, and C. Du, "MGWO-CNN: A bio-inspired deep learning approach for COVID-19 detection in chest X-ray images," *Edelweiss Appl. Sci. Technol.*, vol. 9, no. 4, pp. 379–394, 2025.

19. R. W. Bello, P. A. Owolawi, E. A. Van Wyk, and C. Tu, "SAM-IE: SAM-enabled image enhancement for segmentation of infected cucumber

leaves," unpublished, 2025. [Online]. Available: https://www.researchgate.net

20. R. C. Maswanganyi, C. Tu, P. A. Owolawi, and S. Du, "Single-source and multi-source cross-subject transfer based on domain adaptation algorithms for EEG classification," *Mathematics*, vol. 13, no. 5, p. 802, 2025. [Online]. Available: https://www.mdpi.com

21. R. W. Bello, P. A. Owolawi, E. A. Van Wyk, and C. Tu, *"Architecture for detecting advertisement types,"* unpublished, 2025. [Online]. Available: https://www.researchgate.net

22. R. W. Bello, P. A. Owolawi, C. Tu, and E. A. van Wyk, "Automated fault detection and analysis for large photovoltaic systems using photovoltaic module fault detection in drone vision system," *Edelweiss Appl. Sci. Technol.*, vol. 9, no. 2, pp. 603–626, 2025.

23. Y. B. Lawal, P. A. Owolawi, C. Tu, E. Van Wyk, and J. S. Ojo, "Machine learning-based models for forecasting radio refractivity over the coastal area of South Africa," *Edelweiss Appl. Sci. Technol.*, vol. 1, no. 1, pp. 72–80, 2025.

24. E. Ntuli, P. Owolawi, and C. Du, "5G multi-source traffic analysis using generative adversarial networks," in *Comput. Commun. Eng.: Proc. 4th Int. Conf. CCCE 2024, Oslo, Norway, May 24–26, 2024, Revised Selected Papers*, vol. 2192, Springer Nature, 2025, p. 134.

25. C. M. Nawej, P. A. Owolawi, and T. Walingo, "Toward a realistic comparative analysis," in *Proc. 9th Int. Congr. Inf. Commun. Technol. (ICICT 2024), London*, vol. 9, Springer Nature, 2025, p. 245.

Work in Progress (2020)

Accredited Journals (2020)

1. K. O. Odeyemi**,** and **P. A. Owolawi,** Diversity Techniques on Dual-hops AF Partial Relay Selection Based Energy Harvesting System under Outdated Channel Estimate
   Status: *Submitted in Wireless personal communication with Ref. No:* ***WIRE-10-01449*** *(InReview)*

2. K. O. Odeyemi**, P. A. Owolawi**, and Oladyo O. Olakanmi, Secrecy Outage Probability in Energy Harvesting Aided Underlay Cognitive Radio Network under Eavesdroppers Scenarios

   Status*: Revision: Transactions on Emerging Telecommunications Technologies (Wiley) with Ref. No: ETT-20-0090 (In Review)*

   https://onlinelibrary.wiley.com/journal/21613915

Accredited Conferences (2020)

1. G. Aiyetoro, **P. A. Owolawi** "Dynamic packet scheduling for IoRT devices in 5G satellite networks" 6th International Conference on Advances in Computing & Communication Engineering (ICACCE), 22-24 June, 2020, Las Vegas, USA

2. D.O. Esan, **P. A. Owolawi**, C. Du. **"**Detection of Anomalous Behavioural Patterns In Campus Environment Using CNN-LSTM." 2020 IEEE Technically Sponsored 23rd International Conference on Information Fusion (Fusion 2020) 6th – 9th of July, 2020, Sun City, South Africa. (in review)

3. O.A. Adewumi, **P. A. Owolawi**, J. S. Ojo. **"**Performance Evaluation of Inter Satellite Optical Wireless Communication Link at Specific Optical Wavelengths Using Diverse Modulation Techniques." 2020 IEEE Technically Sponsored 23rd International Conference on Information Fusion (Fusion 2020) 6th – 9th of July, 2020, Sun City, South Africa. (in review)

4. M. Kgabo, J. Ramphela, **P. A. Owolawi**, T. Mapayi & G. Aiyetoro "IoT based integrated data centre infrastructure monitoring system" 2020 International Conference on Artificial Intelligence, Big Data, Computing and Data Communication Systems (icABCD), 6-7 August 2020, Durban, South Africa. (in review)

5. D. K. Morerwa, **P. A. Owolawi,** T. Mapayi & G. Aiyetoro "IoT based access control system using RF technology" 2020 International Conference on Artificial Intelligence, Big Data, Computing and Data Communication Systems (icABCD), 6-7 August 2020, Durban, South Africa (in review)

6. K. Mkhwanazi, **P. A. Owolawi,** T. Mapayi & G. Aiyetoro "Secured IoT based crime reporting system" 2020 International Conference on Artificial Intelligence, Big Data, Computing and Data Communication Systems (icABCD), 6-7 August 2020, Durban, South Africa (in review)

7. N.C.C. Noruwana, **P. A. Owolawi** & T. Mapayi: “Google Assistant Controlled Home Automation” 2020 International Conference on Artificial Intelligence, Big Data, Computing and Data Communication Systems (icABCD), 6-7 August 2020, Durban, South Africa (in review)

8. B. Ncube, **P. A. Owolawi** & T. Mapayi: “Adaptive Personalised Learning System Using Raspberry Pi” 2020 International Conference on Artificial Intelligence, Big Data, Computing and Data Communication Systems (icABCD), 6-7 August 2020, Durban, South Africa (in review)

9. A.S. Makamu**,** **P.A. Owolawi** & T. Mapayi: “IOT-Based Smart Irrigation System” 2020 International Conference on Artificial Intelligence, Big Data, Computing and Data Communication Systems (icABCD), 6-7 August 2020, Durban, South Africa (in review)

10. C. N. Fikile, **P.A. Owolawi** & T. Mapayi: “IOT-Based Health-Band” 2020 International Conference on Artificial Intelligence, Big Data, Computing and Data Communication Systems (icABCD), 6-7 August 2020, Durban, South Africa (in review)

11. T.T. Zwane, **P. A. Owolawi** & T. Mapayi: “Automated Shopping Pal With Raspberry Pi” 2020 International Conference on Artificial Intelligence, Big Data, Computing and Data Communication Systems (icABCD), 6-7 August 2020, Durban, South Africa (in review)

12. T. Mbuku, **P. A. Owolawi**, T. Mapayi & K. O. Odeyemi: “IoT Smart Retail System Using Beacon” 2020 International Conference on Artificial Intelligence, Big Data, Computing and Data Communication Systems (icABCD), 6-7 August 2020, Durban, South Africa (in review)

13. O.P. Mokone, **P. A. Owolawi**, T. Mapayi & K. O. Odeyemi: “Autonomous Waste Sorting Robot Arm” 2020 International Conference on Artificial Intelligence, Big Data, Computing and Data Communication Systems (icABCD), 6-7 August 2020, Durban, South Africa (in review)

14. S.J.M. Maseko, **P. A. Owolawi**, T. Mapayi & K. O. Odeyemi: “Military Smart Vest” 2020 International Conference on Artificial Intelligence, Big Data, Computing and Data Communication Systems (icABCD), 6-7 August 2020, Durban, South Africa (in review)

15. M. Besho, **P. A. Owolawi**, T. Mapayi & K. O. Odeyemi: "Mind Control Mobile Robot and Chatbot" 2020 International Conference on Artificial Intelligence, Big Data, Computing and Data Communication Systems (icABCD), 6-7 August 2020, Durban, South Africa (in review)

16. N.Z.F. Gasa, **P. A. Owolawi**, T. Mapayi & K. O. Odeyemi: "Mobile-Net Neural Network skin disease detector with Raspberry pi Integrated to Telegram" 2020 International Conference on Artificial Intelligence, Big Data, Computing and Data Communication Systems (icABCD), 6-7 August 2020, Durban, South Africa (in review)

2020 Research Publications:

Accredited Journals (2020)

1. M. Clifford, C. Tu, **P. A. Owolawi**, and S. Du, " Factors Influencing Low Intension Detection Rate in a Non-Invasive EEG-based Brain Computer Interface System," Indonesian Journal of Electrical Engineering and Computer Science (IJEECS) *(Accepted)* http://ijeecs.iaescore.com/index.php/IJEECS

2. K. O. Odeyemi**,** and **P. A. Owolawi**, "Secrecy Performance of Cognitive Underlay Hybrid RF/FSO System under Pointing Errors and Link Blockage Impairments," Optical and Quantum Electronics *(Accepted)* https://link.springer.com/journal/11082

3. K. O. Odeyemi**,** and **P. A. Owolawi**, "On the Performance of Energy Harvesting AF Partial Relay Selection with TAS and Outdated Channel State Information over Identical Channels," *International Journal of Electrical and Computer Engineering (IJECE) (Accepted)*

4. K. O. Odeyemi**,** and **P. A. Owolawi**, "Wireless Energy Harvesting Based Asymmetric RF/FSO System with Transmit Antenna Selection and Receive Diversity over M-distribution Channel and Non-Zero Boresight Pointing Error," *optics communication* Jan., 2020 *[Elsevier].* https://www.sciencedirect.com/science/article/abs/pii/S0030401819311812

Conference Proceedings (2020)

1. T. Mapayi**,** and **P.A. Owolawi**: Retinal Vascular Network Segmentation Using Adaptive Thresholding Method Based on LSRV, Third International Conference on

Information and Computer Technologies (ICICT), March 9-12, 2020 at Silicon Valley, San Jose, USA. ***Accepted for publication*** *http://icict.org/index.html*

2. O.B. Akinrinade, **P.A. Owolawi**, C. Du, & T. Mapayi: Melanoma Segmentation Based on Multi-Stage Approach Using Fuzzy and Graph-Cuts Methods, Fifth International Congress on Information and Communication Technology (ICICT 2020) at London, United Kingdom, February 20 - 21, 2020. To be published in *Advances in Intelligent Systems and Computing*. Springer International ***Accepted for publication*** *https://icict.co.uk/index.php*

2019 Research Publications:

Accredited Journals (2019)

Available on Google Scholar

https://scholar.google.com/citations?user=uxyoAbYAAAAJ&hl=en

1. K. O. Odeyemi**,** and **P. A. Owolawi,** , "Relay Selection in Energy Harvesting Aided Mixed RF/FSO System with Transmit Antenna Selection over Atmospheric Turbulence and Pointing Error," *Progress In Electromagnetics Research C*, vol. 97, pp. 107-117, Dec., 2019. http://www.jpier.org/PIERC/pierc97/11.19100103.pdf

2. G. Aiyetoro, **P. A. Owolawi**, "Spectrum Management Schemes for Internet of Remote Things (IoRT) Devices in 5G Networks via GEO Satellite." *Future Internet* **2019**, *11*, 257. https://www.mdpi.com/1999-5903/11/12/257

3. B. Ajewola, **P. A. Owolawi**, and V. M. Srivstava. "Error Performance of Coded BPSK OFDM-FSO System Under Atmospheric Turbulence" Journal of Communications (2019): *http://www.jocm.us/index.php?m=content&c=index&a=show&catid=231&id=1441*

4. K. O. Odeyemi**,** and **P. A. Owolawi**, "On the Performance of Transmit Antenna Selection in Multiuser Asymmetric RF/FSO System under Generalized Order User Scheduling," *Optik – International Journal for Light and Electron Optics [Elsevier]*, vol. 197, pp. 1-10, Nov., 2019 *[Elsevier].* *https://www.sciencedirect.com/science/article/abs/pii/S0030402619309933*

5. **P. A. Owolawi** and K. O. Odeyemi, "On the Outage Performance of Partial Relay Selection Aided NOMA System with Energy Harvesting and Outdated CSI over Non-Identical Channels" *Progress in Electromagnetic Research (PEIR C)*, 2019, ***Accepted for publication*** http://www.jpier.org/PIERC/pier.php?paper=19070303

6. K. O. Odeyemi, and **P. A. Owolawi**, "Error Performance of a Cooperative Diversity Mixed FSO/RF System over Gamma-Gamma and Nakagami-M Fading Channels," *Journal of Communications,* vol.14, no.8, pp.669-675, August, 2019 http://www.jocm.us/index.php?m=content&c=index&a=show&catid=229&id=1405

7. K. O. Odeyemi, and **P. A. Owolawi**, "Impact of Non-Zero Boresight Pointing Errors on Multiuser Mixed RF/FSO System under Nth Best User Selection Scheme" *International Journal of Microwave and Optical Technology (IJMOT),* vol. 14, no. 3, pp. 210-222, May, 2019. https://www.ijmot.com/VOL-14-NO-3.aspx

8. K. O. Odeyemi, **P. A. Owolawi**, and V. M. Srivastava, "Free space optical system with spatial modulation and diversity combiners over atmospheric turbulent channel," *Journal of Communications,* vol.14, no.1, pp.70-81, Jan, 2019. http://www.jocm.us/index.php?m=content&c=index&a=show&catid=216&id=1312

9. K. O. Odeyemi, and **P. A. Owolawi**, "Partial relay selection in mixed RF/FSO dual-hop system over unified M-distributed fading channel with non-zero boresight pointing errors", *Optical and Quantum Electronics*, vol.51, no.5, pp.141, *2019.* https://link.springer.com/article/10.1007/s11082-019-1863-3

10. K. O. Odeyemi, and **P. A. Owolawi** ,"Security outage performance of partial relay selection in AF mixed RF/FSO system with outdated channel state information.", *Transactions on Emerging Telecommunications Technologies*: e3555. *[Wiley], 2019.* https://onlinelibrary.wiley.com/doi/10.1002/ett.3555

11. K. O. Odeyemi, and **P. A. Owolawi**, "Impact of transmission techniques in asymmetric RF/FSO system over Nakagami-m and gamma-gamma fading channels with pointing errors", *International Journal of Communication Systems*, vol. 32, no.3, pp1-20, 2019. https://onlinelibrary.wiley.com/doi/abs/10.1002/dac.3873?af=R

12. K. O. Odeyemi, and **P. A. Owolawi**, “Selection combining hybrid FSO/RF systems over generalized induced-fading channels”. *Optics Communications*, vol. 433, no.1, pp.159-167, 2019. https://doi.org/10.1016/j.optcom.2018.10.009

13. B. D. Ajewole, K. O. Odeyemi, **P. A. Owolawi**, and V. M. Srivastava, “Performance of OFDM-FSO Communication System with Different Modulation Schemes over Gamma-Gamma Turbulence Channel,” *Journal of Communications, vol.*14 no. 6, pp.490-497, 2019. http://www.jocm.us/index.php?m=content&c=index&a=show&catid=221&id=1376

14. Ojo, J. S., and **P. A. Owolawi**. "Characterization of rain heights due to 0° isotherm in tropical and subtropical climates: implication on rain-induced attenuation prediction." Theoretical and Applied Climatology (2019): 1-10. https://link.springer.com/article/10.1007/s00704-018-2382-z

Conference Proceedings (2019)

1. L. J. Mpoporo and **P. A. Owolawi**, “Rain Attenuation Prediction on Earth-Space Paths based on Artificial Neural Networks in South Africa” In *2019 International Multidisciplinary Information Technology and Engineering Conference (*IMITEC 2019*). On Nov. 21, 2019, at Emerald Resort & Casino, 777 Frikkie Meyer Blvd, Vanderbijlpark, 1900, South Africa, IEEE, 2019*. ***Accepted for publication*** ***http://www.vut.ac.za/imitec2019/index.html***

2. O. Olowoyo and **P. A. Owolawi**, “Detection of Malware Using Artificial Neural Networks” In *2019 International Multidisciplinary Information Technology and Engineering Conference (*IMITEC 2019*). On Nov. 21, 2019, at Emerald Resort & Casino, 777 Frikkie Meyer Blvd, Vanderbijlpark, 1900, South Africa, IEEE, 2019*. ***Accepted for publication*** ***http://www.vut.ac.za/imitec2019/index.html***

3. T. Mapayi, and **P. A. Owolawi**, “Automatic Retinal Vascular Network Detection Using Multi-Thresholding Approach Based on Otsu Method,” In *2019 International Multidisciplinary Information Technology and Engineering Conference (*IMITEC 2019*). On Nov. 21, 2019, at Emerald Resort & Casino, 777 Frikkie Meyer Blvd, Vanderbijlpark, 1900, South Africa, IEEE, 2019*. ***Accepted for publication*** ***http://www.vut.ac.za/imitec2019/index.html***

4. J. Madiba, **P. A. Owolawi** and T. Mapayi, "Wi-Fi Enabled Speech Automated Guided Vehicle Using Android and NodeMCU," In *2019 International Multidisciplinary Information Technology and Engineering Conference (*IMITEC 2019*). On Nov. 21, 2019, at Emerald Resort & Casino, 777 Frikkie Meyer Blvd, Vanderbijlpark, 1900, South Africa, IEEE, 2019*. ***Accepted for publication*** ***http://www.vut.ac.za/imitec2019/index.html***

5. K. O. Odeyemi and **P. A. Owolawi** "Performance Analysis of Cooperative NOMA with Partial Relay Selection under Outdated Channel Estimate" *2019 Wireless Africa IEEE conference.* ***Accepted for publication*** https://wirelessafrica19.trackchair.com/

6. J.A. Adisa, S.O. Ojo, **P.A. Owolawi** and P.A. Beatrijs. "Financial Distress Prediction: Principle Component Analysis and Artificial Neural Networks" In *2019 International Multidisciplinary Information Technology and Engineering Conference (*IMITEC 2019*). On Nov. 21, 2019, at Emerald Resort & Casino, 777 Frikkie Meyer Blvd, Vanderbijlpark, 1900, South Africa, IEEE, 2019*. ***Accepted for publication*** ***http://www.vut.ac.za/imitec2019/index.html***

7. S.O. Ojo, **P.A. Owolawi**, M. Mphahlele and J.A. Adisa. "Stock Market Behaviour Prediction using Stacked LSTM Networks" In *2019 International Multidisciplinary Information Technology and Engineering Conference (*IMITEC 2019*). On Nov. 21, 2019, at Emerald Resort & Casino, 777 Frikkie Meyer Blvd, Vanderbijlpark, 1900, South Africa, IEEE, 2019*. ***Accepted for publication*** ***http://www.vut.ac.za/imitec2019/index.html***

8. L.J Mpoporo and **P.A. Owolawi**. "Earth-Space Rain Attenuation prediction using Optimum Algorithm of Artificial Neural Networks" In *2019 International Multidisciplinary Information Technology and Engineering Conference (*IMITEC 2019*). On Nov. 21, 2019, at Emerald Resort & Casino, 777 Frikkie Meyer Blvd, Vanderbijlpark, 1900, South Africa, IEEE, 2019*. ***Accepted for publication*** ***http://www.vut.ac.za/imitec2019/index.html***

9. E. G. Dada, T. Mapayi, M. Olaifa, and **P. A. Owolawi**. "Credit Card Fraud Detection using k-star Machine Learning Algorithm." TOKI 2019: Transition from Observation To Knowledge To Intelligence, University of Lagos, Lagos State, Nigeria, August 15-16, 2019. https://toki-ng.net/toki2019/

10. Adedoja A., **P.A. Owolawi** and Mapayi T.: Deep Learning Based On NASNet for Plant Disease Recognition Using Leave Images. 2019 IEEE Sponsored International Conference on Advances in Big Data, Computing and Data Communication Systems (icABCD 2019)**,** 5th - 6th of August, 2019, Drakensberg Sun Resort, Winterton, KwaZulu Natal, South Africa**.** **https://ieeexplore.ieee.org/document/8851029**

11. Sello Mathatho, **Pius Owolawi** and Chunling Tu: Prediction of Methane Levels in Underground Coal Mines using Artificial Neural Networks. 2019 IEEE Sponsored International Conference on Advances in Big Data, Computing and Data Communication Systems (icABCD 2019)**,** 5th - 6th of August, 2019, Drakensberg Sun Resort, Winterton, KwaZulu Natal, South Africa**.**
https://ieeexplore.ieee.org/document/8851041

12. B. D. Ajewole, **P. A. Owolawi**, Viranjay M. Srivastava and Odeyemi, Kehinde: Coded BPSK OFDM-FSO over Strong Turbulence Channel. 2019 IEEE Sponsored International Conference on Advances in Big Data, Computing and Data Communication Systems (icABCD 2019)**,** 5th - 6th of August, 2019, Drakensberg Sun Resort, Winterton, KwaZulu Natal, South Africa**.**
https://ieeexplore.ieee.org/document/8851036

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BOOK PUBLICATION

Book

Rain at SHF and EHF for Radio Links in South Africa: Characteristics of Rain at SHF and EHF for Terrestrial and Satellite Links in South Africa, Publisher: LAP LAMBERT academic publisher, November 24, 2011. ISBN-10: 384659654X and ISBN-13:978-3846596548

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3. K. O. Odeyemi, and **P. A. Owolawi**, "On the Performance of Energy Harvesting AF Partial Relay Selection with TAS and Outdated Channel State Information over Identical Channels," *International Journal of Electrical and Computer Engineering (IJECE) (Accepted)*

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CONFERENCE PROCEEDINGS

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39. T. Mapayi**,** and **P.A. Owolawi**: Retinal Vascular Network Segmentation Using Adaptive Thresholding Method Based on LSRV, Third International Conference on Information and Computer Technologies (ICICT), March 9-12, 2020 at Silicon Valley, San Jose, USA. ***Accepted for publication*** *http://icict.org/index.html*

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Public Talks

- Influence and Persuasion in Leadership-Academic Leadership Programme (ALP), Tshwane University of Technology, South Africa.
- Presenter and panellist-TUT Indaba tackles 4IR challenges
- The meeting of the champions- Mangosuthu University of technology, Leadership seminar
- Six organs of Thought leaders-EAC conference in September, 2014
- 35 Thing to do before you clock 35 years- 35-year anniversary of the Mangosuthu University of Technology, 2014.

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