

POSTGRADUATE RESEARCH & INNOVATION SYMPOSIUM

PRIS²⁰²⁵ Highlights



The College of Agriculture, Engineering and Science hosted its fifteenth Postgraduate Research and Innovation Symposium (PRIS) on 28 and 29 October at the Coastlands Hotel, Musgrave – the third off-campus edition of this event. This year's theme centred on *The International Year of Quantum Science and Technology*. Over 400 delegates attended, and 230 students from all five Schools presented their research in oral or flash presentation sessions, with prizes to the value of R259 000 awarded to the best-performing students.

Welcoming delegates, the College of Agriculture, Engineering and Science Dean of Research, Professor Rituparno Goswami, emphasised that the two days were dedicated to postgraduate students.

"There's nothing more exciting or gratifying than to showcase the knowledge you generated to your colleagues, friends, and external stakeholders," said Goswami.

Goswami celebrated 15 years of the PRIS event, highlighting it as a strategic fixture on the University calendar that aligns with global research trends toward increased collaborative research for the sustainability of humankind.

"PRIS gives you a unique platform, staying within the University, to interact and collaborate with your colleagues and develop your future research initiatives."
- Professor Rituparno Goswami

Acting Deputy Vice-Chancellor of Research and Innovation, Professor Anil Chuturgoon, opened proceedings on behalf of Vice-Chancellor Professor Nana Poku.

"Now is a pivotal moment in science and scholarship; the world stands at the threshold of a new era shaped by quantum science and technology, where the strange and powerful laws of the quantum realm promise transformative advances across computation, communication, sensing, and materials," said Chuturgoon.



Professor Rituparno Goswami

Professor Anil Chuturgoon

"As we celebrate this year, we affirm the University of KwaZulu-Natal's commitment to leading from the front by nurturing curious minds, cultivating rigorous enquiry, and translating ideas into tangible societal impact," he said.

Chuturgoon emphasised UKZN's commitment to excellence, collaboration, and impact. Its research ecosystem, interdisciplinary hubs, and partnerships with industry and government provide fertile ground for quantum thinking to flourish.

"The International Year of Quantum Science and Technology is a call to align our education, our research design, and our outreach with the realities of a world that increasingly relies on quantum-enabled solutions," said Chuturgoon, highlighting UKZN's 2025 establishment of the Centre for Quantum Computing and Technology.

Chuturgoon encouraged the presenters from a wide array of disciplines to consider how to apply their knowledge to problem-solving and opportunity creation, and

to collaborate with industry and public stakeholders to multiply their efforts.

Chuturgoon thanked the facilitators, organisers, sponsors and exhibitors for translating the vision into action, making the experience possible.

"Let us honour the International Year of Quantum Science and Technology by embracing a future where knowledge, integrity and collaboration open pathways to new technologies, healthier lives, and a more resilient society. May your enquiries be courageous, your collaborations fruitful, and your journeys as postgraduate researchers at UKZN be transformative," he concluded.

"Our postgraduate researchers are the heartbeat of this Symposium," said Chuturgoon.

"Your work, whether it probes fundamental questions about quantum phenomena, develops novel quantum-inspired algorithms, or explores practical quantum technologies for healthcare, agriculture, or energy, embodies the spirit of enquiry that drives progress. This year, you join a global movement that recognises how quantum science can redefine what is possible. Your ideas today may become the innovations of tomorrow that uplift communities, empower industries, and strengthen our nation's scientific leadership."

Keynote Address

The opening keynote was presented by Professor Val Zwiller, Professor of Physics at Sweden's Royal Institute of Technology (KTH), where he heads the Quantum Nano Photonics research group, and is Chief Science Officer at Single Quantum, a company he cofounded to develop cutting-edge single-photon detectors; he spoke on the topic of "Detecting light at the single photon level: quantum devices and applications".

He described the history of single-photon research and the quest to improve detection efficiency and



"To go and develop quantum technology, we need to put all of society together, not only academia, but also industry and all participants to really show that there are a lot of potential applications available."
- Professor Val Zwiller

generation, which requires novel quantum properties. He demonstrated quantum devices used by physicists and described the kind of collaborative work his group hopes to undertake with UKZN. The applications of this work extend to quantum sensing, encrypted quantum communication, quantum computing and more. He highlighted exciting developments in deep-space communication enabled by this technology, as well as observations of a living brain using single-photon technology. Additional applications include extreme event forecasting and defence.

Student Presentations

After the opening session, students from the College's five Schools (of Agricultural, Earth and Environmental Science, Chemistry and Physics, Engineering, Life Sciences, and Mathematics, Statistics and Computer Science) presented a range of diverse research in parallel sessions.

These presentations were assessed by internal academics and external stakeholders who brought a wide range of experience and expertise. External judges had the opportunity to become acquainted with the work being carried out by UKZN's postgraduate students in the sciences, to challenge students to produce and present research to industry standards, and to enhance collaboration between UKZN and the organisations they represented.



Guest Lecture

On behalf of the Executive of Scientific Services for uMngeni-uThukela Water (UUW), Dr Ntsapokazi Deppa, Dr Thokozani Mncube, Senior Manager of Technology and Innovation, presented a guest lecture on inspiring UUW's research and innovation through Research and Innovation Chairs. UKZN hosts a Research Chair position in Water Resources Research and Innovation, held by Professor Jeff Smithers since 2021, which was established to develop a world-class research group and deliver high-impact, innovative and use-inspired research outputs, thereby contributing to the development of water scientists, engineers and researchers to create a growing knowledge economy to meet the challenge of sustainable water resources.



Science With Jazz

In a unique contribution to the PRIS programme, Professor Thomas Konrad, Director of UKZN's Centre for Quantum Computing and Technology, presented a lecture on the topic of "The Present and Future of Quantum Technology", accompanied by Mr Linda Sikhakhane on saxophone and Mr Paras Dlamini performing vocally. Their moving and melodic contributions provided a holistic picture of the subject of quantum physics, giving audience members moments to reflect on Konrad's exposition of what the world can expect from the second quantum revolution after the first transformed the development of computers, lasers, electron microscopes, nuclear weapons, power plants, medical

imaging, and more. Konrad presented the new paradigm of Quantum Information, its potential impact on computation, communication, and sensing or imaging technologies, and a perspective on what this means for UKZN research and for Africa.

This was the tenth in a series of seminars that couple a scientific presentation with a musical performance by acclaimed artists to explore the paradigm shifts that both disciplines offer in advancing human ideals and development.



Gala Dinner

The gala dinner on the evening of 28 October, emceed by Professor Alan Matthews, provided attendees with more opportunities to engage with one another, enjoy entertainment by Jamy-Lee Simons, and hear a keynote address from Dr Happy Sithole of the Council for Scientific and Industrial Research (CSIR).

Welcoming guests, Acting Dean of Research, Professor Neil Koorbanally, said, "This event has the makings of an international conference. In research, one of the big buzzwords is interdisciplinarity – you can only solve the world's problems working together. What better way to connect with fellow scientists?"

He noted that each student was given the experience of attending an international conference and a platform to make their mark, gaining the confidence and tools to do so in the world.

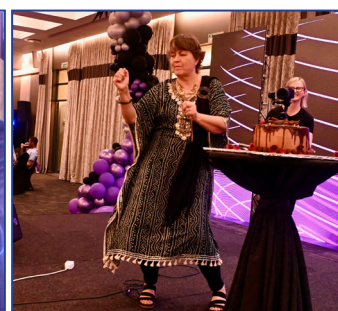
Sithole expressed his thanks for the opportunity to talk to students and delivered

a presentation on the evolution of classical computers and the challenges they face. He explained the applicability of computing to various industries and the data it provides for decision-making. He said the advent of and the progress in quantum computing have led to its status as a multibillion-dollar industry. He spoke about South Africa's standing in quantum computing and the field's long-term potential to revolutionise several applications.

The evening was also enhanced with the presentation of several lucky draw prizes and the acknowledgement of the vital support of sponsors and industry partners, as well as an acknowledgement of the services of retiree Dr Tanja Reinhardt or "Dr T", known for her award-winning Science, Technology, Engineering and Mathematics outreach through the Science and Technology Education Centre (STEC) at UKZN.



*"It's in settings like this that science grows."
- Professor Neil Koorbanally*



Industry Session

A concurrent industry session on the second day of the symposium allowed students to benefit from concise, informative presentations from industry partners, including uMngeni-uThukela Water, First National Bank, Standard Bank, the National Research Foundation, the Feenix Trust, the KwaZulu-Natal Department of Transport, the Department of Agriculture, Eskom, the South African Council for Natural Scientific Professions, the CSIR, the South African National Roads Agency, and the Agricultural Research Council.



Industry Partners and Exhibitors

22 external sponsors and exhibitors and 60 internal partners contributed to proceedings and student prizes and demonstrated what their organisations offer and what services they provide to the University and broader society.



Student Research Stories

In the lead-up to PRIS 2025, the stories of students conducting impressive research across the College were featured on the PRIS website and in a series of communiques.

[Read the Stories](#)



Prize-Giving

The event concluded with a prize-giving session where the top two presentations from each School in both the oral and flash presentation categories were rewarded, with a special prize in each category per School, awarded to the research that demonstrated the most significant societal impact, as voted by the audience. Several lucky draw prizes were also awarded by sponsors, including UKZN's ICS division.

Professor Fhatuwani closed the prize-giving session. The vote of thanks included the overall organiser, Ms Leena Rajpal; the Moodle coordinating committee; the technical committee; the social media and website champions; the ICS technical support team; the CAES management; the session chairs and co-hosts; the internal and external judges; and the Public Relations committee.





PRIS Winners

Prize-winners in the **oral category** received R15 000, R10 000 and R5 000 for first, second and third place, respectively.



Prize-winners in the **flash category** received R10 000, R5 000 and R3 000 for first, second and third place, respectively.

For the **biggest impact awards**, oral presenters in each School received R5000, while flash presenters received R3000.



SCHOOL OF AGRICULTURAL, EARTH & ENVIRONMENTAL SCIENCES	
ORAL	FLASH
	
<p>FIRST PRIZE (sponsored by the College of Agriculture, Engineering and Science): Glen Mkhonta (Evaluating the Predictive Accuracy of Coupled HEC-HMS-HEC-RAS Models for Flood Simulation in the Lowest Sub-Catchment of the uMngeni River, KwaZulu-Natal, South Africa)</p>	<p>FIRST PRIZE (sponsored by the College of Agriculture, Engineering and Science): Thobani Ngwazi (An Assessment of Radon (²²²Rn) Levels in Aquifers Along the Umgeni Catchment: Health and Geohydrological Significance)</p>
<p>SECOND PRIZE (sponsored by the College of Agriculture, Engineering and Science): Thando Mthembu (Developing a Machine Learning Meta-Model Trained on AquaCrop Simulations to Predict Taro (<i>Colocasia esculenta</i> L. Schott) Yield in Southern Africa)</p>	<p>SECOND PRIZE (sponsored by the College of Agriculture, Engineering and Science): Tholoana Mofurutsi (Host-Plant Mediated Selection of Beneficial Microbes in the Presence of Plant Resistance Inducers)</p>
<p>THIRD PRIZE (sponsored by the College of Agriculture, Engineering and Science): Emmanuel Valentine (Effect of municipal wastewater supplementation on growth, leaf gas exchange, and chlorophyll fluorescence of <i>Lycopersicon solanum</i> in non-circulating hydroponics)</p>	<p>THIRD PRIZE (sponsored by the College of Agriculture, Engineering and Science): Mxolisi Shangase (The effect of moisture content on the sensory properties of rabbit biltong: advancing sustainable meat innovation)</p>
<p>BIGGEST IMPACT (sponsored by the College of Agriculture, Engineering and Science): Emmanuel Valentine (Effect of municipal wastewater supplementation on growth, leaf gas exchange, and chlorophyll fluorescence of <i>Lycopersicon solanum</i> in non-circulating hydroponics)</p>	<p>BIGGEST IMPACT (sponsored by the College of Agriculture, Engineering and Science): Faith Sibiya (Drivers of Eutrophication and Algal Proliferance in the Umngeni- Midmar, Albert Falls, Nagle and iNanda.)</p>


SCHOOL OF CHEMISTRY AND PHYSICS	
ORAL	FLASH
	
FIRST PRIZE (sponsored by SASOL): Ngonidzashe Ruwizhi (Novel piano-stool pyrazolyl-functionalized Ru(II)-NHC complexes: synthesis, characterisation, antibacterial and theoretical studies)	FIRST PRIZE (sponsored by SASOL): Mariam Hajee (Comparison of graphene and reduced graphene oxide-chitosan composites for the electrochemical detection of lamivudine)
SECOND PRIZE (sponsored by the College of Agriculture, Engineering and Science): Asanda Ngwenya (Synthesis and structural characterization of O ⁻ N ⁺ O-donor Zn and Mn complexes as catalysts for the production and depolymerization of PLAs)	SECOND PRIZE (sponsored by the College of Agriculture, Engineering and Science): Dipika Gobind (Synthesis of reduced graphene oxide and graphitic carbon nitride for solar energy applications)
THIRD PRIZE (sponsored by the college of Agriculture, Engineering and Science): Kwanele Mazibuko (Development of the atmospheric monitoring system for a balloon-borne system.)	THIRD PRIZE (sponsored by the College of Agriculture, Engineering and Science): Keleish Pillay (Development of a suitable and sensitive biomarker for the detection and prevention of fuel adulteration)
BIGGEST IMPACT (sponsored by the College of Agriculture, Engineering and Science): Mary Akano (Boron nitride doped graphitic carbon nitride nanocomposites for the photocatalytic degradation of PFAS)	BIGGEST IMPACT (sponsored by the College of Agriculture, Engineering and Science): Saheed Jimoh (Evaluation of Energy Potential Estimation Using Modified Multi-Component Weibull Mixture Functions.)



SCHOOL OF ENGINEERING	SCHOOL OF ENGINEERING & SCHOOL OF MATHEMATICS, STATISTICS AND COMPUTER SCIENCE
ORAL	FLASH
	
<p>FIRST PRIZE (sponsored by SASOL): Elijah Joseph (Design and development of a metamaterial-based mimo antenna for uwb applications)</p>	<p>FIRST PRIZE (sponsored by the College of Agriculture, Engineering and Science): Slungile Tshibase (Classification of equations using λ-symmetries)</p>
<p>SECOND PRIZE (sponsored by the College of Agriculture, Engineering and Science): Wamashudu Netshirungulu (Modelling the post-harvest losses of underutilised crops: A literature review)</p>	<p>SECOND PRIZE (sponsored by Entelect): Sandile Dladla (Enhancing Design Flood Estimation through Copula-Based Joint Modelling of Flood Peak and Volume in South Africa)</p>
<p>THIRD PRIZE (sponsored by the College of Agriculture, Engineering and Science): Dikeledi Monyetware (Extraction and characterization of chitin biopolymer from mopane worm (<i>Imbrasia belina</i>))</p>	<p>THIRD PRIZE (sponsored by the College of Agriculture, Engineering and Science): Amna Ibrahim (Stability and Optimal Control Analysis of an HCV Model with Immune Response)</p>
<p>BIGGEST IMPACT (sponsored by the College of Agriculture, Engineering and Science): Elijah Joseph (Design and development of a metamaterial-based MIMO antenna for UWB applications)</p>	<p>BIGGEST IMPACT (sponsored by the College of Agriculture, Engineering and Science): Olayinka Onifade (Inertial self-adaptive algorithm for solving non-Lipschitz monotone variational inclusion problems.)</p>



SCHOOL OF LIFE SCIENCES	
ORAL	FLASH
	
FIRST PRIZE (sponsored by the College of Agriculture, Engineering and Science): S'thandiwe Magwaza (<i>Chaetomorpha linum</i> Extract Enhances Glucose Uptake, Modulates Polyol Pathway and Glucose Metabolic Enzymes in Glucotoxic Adipose Tissue <i>Ex Vivo</i>)	FIRST PRIZE (sponsored by the College of Agriculture, Engineering and Science): Arvish Maharaj (antioxidant, antibacterial, and cytotoxic properties in crude extracts of <i>Bougainvillea glabra</i> leaves, stems, and flowers)
SECOND PRIZE (sponsored by the College of Agriculture, Engineering and Science): Sphamandla Ndlovu (The Role of Histidine 382 on the Stability and Ligand Binding of the E2 Domain of Amyloid Precursor Protein)	SECOND PRIZE (sponsored by the College of Agriculture, Engineering and Science): Ayesha Hussan (Cytotoxicity and Cellular uptake of Co-polymer-Functionalized Gold Nanoparticle: siRNA nanocomplexes in Breast Cancer Cell models)
THIRD PRIZE (sponsored by the College of Agriculture, Engineering and Science): Valencia Ndlangamandla (Genome-wide Single Nucleotide Polymorphism (SNP) Discovery, Genetic Variation, and Population Structure of South African and Eswatini Cannabis sativa L. Varieties)	THIRD PRIZE (sponsored by the College of Agriculture, Engineering and Science): Saiesha Harpal (Mini-barcodes improve species detection rates in DNA metabarcoding of marine zooplankton)
BIGGEST IMPACT (sponsored by the College of Agriculture, Engineering and Science): S'thandiwe Magwaza (<i>Chaetomorpha linum</i> Extract Enhances Glucose Uptake, Modulates Polyol Pathway and Glucose Metabolic Enzymes in Glucotoxic Adipose Tissue <i>Ex Vivo</i>)	BIGGEST IMPACT (sponsored by the College of Agriculture, Engineering and Science): Vunene Chabalala (Exploring <i>Dichotomaria diesingiana</i> 's Protective Effects towards Oxidative Stress and Enzyme Regulation in Pancreatic Dysfunction)

SCHOOL OF MATHEMATICS, STATISTICS AND COMPUTER SCIENCE	
ORAL	
	FIRST PRIZE (sponsored by FNB): Sarah Oguto (A comparative analysis of imputation techniques for high-dimensional longitudinal biomarkers: utilizing the Cox-shared frailty model to estimate time-varying effects in HIV incidence)
SECOND PRIZE (sponsored by the College of Agriculture, Engineering and Science): Lethukuthula Ndebele (A Block Hybrid Method for Nonlinear Boundary Value Problems: Application to Casson Fluid)	
THIRD PRIZE (sponsored by the college of Agriculture, Engineering and Science): Ntuthuko Zuma (Perfect Compactifications of Frames)	
BIGGEST IMPACT (sponsored by the college of Agriculture, Engineering and Science): Ntuthuko Zuma (Perfect Compactifications of Frames)	

Lucky Draw Winners



Headphones sponsored by ICS:

- Onesipho Ntombela
- Amna Ibrahim
- Nerissa Rajkumar
- Olumide Afolabi
- Tinashe Chatara
- Andile Phelako
- Faith Sibiyá
- Megan Schalkwyk
- Peter Munyao Mutuku
- Nokukhanya Khanyile

Laptop sponsored by ICS:

- Glen Mkhonta
- Chidimma Evangeline Oliobi
- Abubakar Adenule Muritala

Hard drive sponsored by ICS:

- Nokwanda Majozi
- Zakariya Dorcat

Website Addresses

- Main Website: <https://pris.ukzn.ac.za/>
- Proceedings: <https://pris.ukzn.ac.za/wp-content/uploads/2025/10/PRIS-2025-Full-Proceedings-1.pdf>
- Spotlight on PRIS 2025: <https://youtu.be/5Clbsl9gsPM>
- Spotlight on PRIS 2025 - School of Agriculture and Science: <https://youtu.be/eNb57osFJQM>
- Spotlight on PRIS 2025 - School of Engineering: <https://youtu.be/OWUeyXeXhk>



Our Sponsors

Many thanks to our internal and external partners for their support of PRIS 2025:



- UKZN College of Agriculture, Engineering and Science Finance Department
- UKZN Research Office
- UKZN Information and Communication Services
- African Centre for Crop Improvement
- Analytical Environmental Chemistry Research Group
- Astrophysics Research Centre
- Biomedical Optics Research Group
- Bioprocess Research Group
- Centre for Functional Biodiversity and Oppenheimer Fellow in Functional Biodiversity
- Centre for Quantum Computing and Technology
- Centre for Transformative Agricultural and Food Systems
- Computer Vision and Machine Learning Research Lab
- Energy Materials Research Group
- Envirosensors Research Group
- Image Processing, Computer Vision and Data Mining Research Group
- KZNDOT Chair in Sustainable Transportation- Sustainable Transportation Research group (STRg)
- Laser Material Research Group
- Nano-Chemistry Research Group
- Nano-Gene and Drug Delivery Group
- Organic Synthesis and Medicinal Chemistry
- Quantum Research Group
- Research in Automation and Intelligent Networks (RAIN)
- Research Productivity
- School of Agriculture and Science
- School of Engineering
- Structural Chemistry Research Group
- Thermodynamics Research Unit
- The National Research Foundation South African Research Chair in Land Use Planning and Management
- Umgeni Water Chair of Water Resources Research and Innovation
- Water Sanitation and Hygiene Research and Development (WASH R&D) Centre
- Dr Bhekumuzi Gumbi, Envirosensors Research Group, School of Agriculture and Science, Discipline of Chemistry
- Dr Mervlyn Moodley, Quantum Research Group, School of Agriculture and Science, Discipline of Physics
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- Professor Brenda Moodley, Analytical Environmental Chemistry Research Group, School of Agriculture and Science, Discipline of Chemistry
- Professor David Lokhat, Reactor Technology Research Group, School of Engineering
- Professor Genee Mola, Energy Materials Research Group, School of Agriculture and Science, Discipline of Physics
- Professor Glen Bright, School of Engineering (Dean and Head of School)
- Professor Jeff Smithers, uMngeni-uThukela Water Chair of Water Resources Research and Innovation, School of Engineering
- Professor Jules-Raymond Tapamo, Image Processing, Computer Vision and Data Mining Research Group, School of Engineering
- Professor Julia Sibiyi, School of Agriculture and Science, Discipline of Agricultural Science
- Professor Keshlan Govinder, Astrophysics Research Centre, School of Agriculture and Science, Discipline of Mathematics
- Professor Kuvanesan Moodley, Thermodynamics Research Unit, School of Engineering
- Professor Mohamed Mostafa, KZNDOT Chair in Sustainable Transportation – Sustainable Transportation Research Group (STRg)
- Professor Mogie Singh, Nano-Gene and Drug Delivery Group, School of Agriculture and Science, Discipline of Biological Sciences
- Professor Naven Chetty, Biomedical Optics Research Group, School of Agriculture and Science, Discipline of Physics
- Professor Onesimo Mutanga, South African Research Chair in Land Use Planning and Management, School of Agriculture and Science, Discipline of Chemistry
- Professor Parvesh Singh, Organic Synthesis and Medicinal Chemistry, School of Agriculture and Science, Discipline of Chemistry
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- Professor Serestina Viriri, Computer Vision and Machine Learning Research Lab, School of Agriculture and Science, Discipline of Computer Science
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- Professor Sudan Hansraj, School of Agriculture and Science, Discipline of Mathematics
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- Professor Thomas Konrad, Centre for Quantum Computing and Technology, School of Agriculture and Science, Discipline of Physics
- Professor Tom Walingo, Research in Automation and Intelligent Networks (RAIN) Centre, School of Engineering
- Professor Vincent Nyamori, NanoChemistry Research Group, School of Agriculture and Science, Discipline of Chemistry
- Professor Viranjan Srivastava, School of Engineering



**SAVE THE
DATE**



PRIS 2026

POSTGRADUATE RESEARCH & INNOVATION SYMPOSIUM

DATE

28 & 29
October 2026

(Wednesday and Thursday)

VENUE

**Coastlands
Hotel,**
Musgrave, Durban

THEME

**International
Year of
Rangelands and
Pastoralists**

QUERIES

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