NSTF
National Science & Technology Forum

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Artificial Intelligence in STEM education

an NSTF-pro*SET* Discussion Forum

19 August 2026

Speakers' Biographies

09:10-09:50

Solving without reasoning: What AI means for learning mathematics -Implications for Initial Teacher Education in Primary Mathematics



Dr Kathleen Fonseca is the Head of the Department of Childhood Education at the University of Johannesburg (UJ) and a leading researcher in mathematics education. Her work focuses on the development of mathematical knowledge and problem-solving among student teachers, children's mathematical cognition, and early numeracy development. She has a particular interest in understanding and addressing early numeracy learning difficulties, exploring how children acquire foundational number

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concepts and the factors that influence mathematical learning. Through interdisciplinary research that integrates education and neuroscience, including the use of functional near-infrared spectroscopy (fNIRS), Dr Fonseca investigates the cognitive processes underlying mathematical thinking and learning. Her research aims to inform evidence-based approaches to mathematics teaching, teacher education, and interventions that support learners at risk of mathematical difficulties.

10:00-10:30

AI in Education: Ethics, Equity and the road ahead



Mr Tumang Andrew Cheda is an information technology (IT) and telecommunications leader with over 18 years of experience spanning technical management, consulting, business development, and service delivery. He holds a BSc in Informatics and an MBA from the Gordon Institute of Business Science (GIBS). He currently serves as Vice Chairperson of the Special Interest Group on Artificial Intelligence (AI) and Robotics (SIGAIR) at the Institute of Information Technology Professionals South Africa (IITPSA), where he actively contributes to shaping national discourse on emerging technologies.

A seasoned industry professional, Tumang has held key roles at ATIO Corporation and MetroTelWorks, gaining deep insight into both enterprise and service-provider environments. He is a strong advocate for closing South Africa's (SA's) AI "implementation gap," emphasising practical adoption and sustainable impact over theoretical readiness — a focus that today extends into how AI is adopted ethically and equitably in education.

Beyond his professional pursuits, Tumang is an endurance athlete who completed his first Two Oceans Ultra Marathon and Comrades Marathon this year — an achievement that reflects his professional ethos of discipline, resilience, and long-term commitment.

Known for his ability to translate strategic vision into operational reality, Tumang specialises in bridging the gap between technology ambition and execution. He brings a pragmatic, evidence-based leadership approach to digital transformation, ensuring that innovation initiatives are driven by data, feasibility, and measurable outcomes rather than trends alone.

10:30-11:00

Harnessing Artificial Intelligence to Strengthen STEM Teacher Education



Dr Justinus Rankgakgata Setshedi is an educator teacher. He is a teacher by profession and a researcher. He has over twenty-nine years of teaching experience at the primary and secondary schools. He was a primary school deputy principal and principal from 1998 to 2007. Dr Setshedi graduated with PhD in Education at University of South Africa (UNISA) in 2022.His research interest includes Open Educational Resources, Teaching Practice, Grade R Teacher Education, Early Childhood Education, and inclusive Education. Dr Setshedi recently co-published a valuable article titled Teacher Education Lecture's views of Open Educational Resources. His research activities have seen him delivering presentations at various local and international research conferences such SANORD 2022 International Conference, EASA annual conference 2024 and 2025.

Dr Setshedi is a flipped instructional scholar of note. His role as a lecturer and Teaching Practice Co-ordinator at the University of Limpopo from 2013 to 2017 impacted on the training of over five thousand Initial Teacher Education (ITE) students. Dr Setshedi has also served as the Chairperson Correctional Services Parole Board (CSPB) of Zonderwater Correctional Management. In addition, he served as a member of Setswana National Language Board (SNLB) from 2013 to 2016.

Currently, Dr Setshedi is employed as a Deputy Director at the Department of Education and Training (DHET) since 2017. His duties in the field of teacher education and development include being the Secretariat on behalf of Department at the Provincial Teacher Development Committee (PTEDC) meetings for the nine provinces in South Africa. He is also leading and managing the Teacher Education for Inclusive Teaching Project (TEfIT), as part of the R200 million Teaching and Learning Capacity Improvement Capacity Improvement Programme (TLDCIP), which is co-funded by the European Union (EU). Dr Setshedi initiates and manages new projects and programmes to support the development of teachers and lecturers for schooling and post-schooling systems. He is also a Task Team member who reviewed the Revised Policy on Minimum Requirements for Teacher Education Qualifications (2015). Moreover, he is a member of the Teacher Education Programme Evaluation Committee (TEPEC) and College Programme Evaluation Committee (COPEC) at the DHET responsible for evaluation of basic education, Adult and Community Education (ACET) and Technical and Vocational Education and Training (TVET) Teacher education programmes developed by higher education institutions for alignment with prevailing teacher education policies and for employment in education.

11:00-11:30

Why AI Will Fail in South African STEM Classrooms—Unless We Put Human Learning First



Prof Clement Simuja is Associate Professor: Human-Centred Learning and Technology at the University of the Western Cape (UWC), where he directs the Human-Centred Learning Technologies Lab (HCLT Lab). He is Senior Editor of Social Sciences & Humanities Open (Elsevier) and serves as an executive member of the South African Education Research Association (SAERA) and the Southern African Association for Research in Mathematics, Science and Technology Education (SAARMSTE). His work explores the intersection of AI and human learning, specifically how intelligent technologies can be designed and integrated to serve, rather than replace, teachers and learners in under-resourced and multilingual African classrooms. He is currently building a research hub at UWC focusing on research and interventions that place human pedagogy at the centre of technological change, teacher development, computational thinking, and self-regulated learning in marginalised schools.

11:30-12:00

Building understanding, trustworthy AI use and learner participation



Dr Seani Rananga is a Lecturer in the Department of Computer Science at the University of Pretoria, South Africa, and a fellow at the African Institute of Data science and AI(AfriDSAI) and also senior member of the Data Science for Social Impact (DSFSI) research group. She specialises in machine and deep learning, as well as natural language processing (NLP), with research interests spanning across multilingual and multimodal AI, misinformation and disinformation detection, explainable AI, large language models (LLMs), retrieval-augmented generation (RAG), sentiment analysis and many more.

12:00- 12:30

From AI Access to AI Agency -Building an Equitable STEM Pipeline for South Africa



Ms Mpolai Anacletta Koloko is a STEM education professional with extensive experience in education programme execution, curriculum implementation, teacher development, project management and stakeholder engagement. (STEM = science, technology, engineering and mathematics). Through her work with the Sasol Foundation, she supports initiatives that advance mathematics, science, coding and robotics, digital skills, innovation and equitable access to quality STEM education. Her work focuses particularly on strengthening teacher capacity and creating practical, future-focused learning opportunities for learners in South African schools. She is passionate about the responsible integration of emerging technologies, including AI, into STEM education to enhance teaching and learning, while addressing issues of equity, access, teacher preparedness and meaningful classroom implementation.

12:30-13:00

From AI avoidance to AI literacy: Preparing STEM graduates for an AI-enabled world of work



Dr Mfowabo Maphosa is a Lecturer in the School of Engineering within the Faculty of Engineering, Built Environment and Information Technology (IT) at the University of Pretoria (UP) and a Research Fellow at the African Institute of Data Science and AI. He has over a decade of lecturing experience in higher education and holds a BSc in IT and Computer Science, a BSc Honours in Information Systems (cum laude), and an MSc in Computing, as well as a PhD in Electronic and Electrical Engineering.
Dr Maphosa has published and presented at both local and international conferences. His work focuses on generative AI and agentic AI in higher education, STEM education, machine learning applications, e-waste management, ICT for Development and sustainable digital technologies. He is passionate about promoting the ethical, responsible, and inclusive adoption of AI to advance education, innovation, and sustainable development.

13:00-13:30

AIFT STEAM Foundation Programme



Prof Stephen M Turing Akandwanaho is an Associate Professor, Artificial Intelligence, NWU Business School and a Senate Member of the Alpvest Institute for FutureTech (AIFT). He is an accomplished academic, researcher and higher education leader with internationally recognised expertise in artificial intelligence, digital transformation, intelligent automation and organisational innovation. His work encompasses research, postgraduate education, curriculum innovation and the application of emerging technologies to complex business and societal challenges. Through his scholarship, institutional leadership and industry engagement, Prof Akandwanaho contributes to responsible digital transformation and the development of future-ready graduates and leaders.