S.E.T. for socio-economic growth
National Science and Technology Forum (NSTF)

media release

NSTF hosts inspiring motivational talks for Brilliants students:

2024 winners of the "Science Oscars of South Africa" share insights on STEM careers and leadership

On 6 September, the NSTF hosted the National Science and Technology Forum (NSTF), hosted the motivational talks online, with six 2024 NSTF-South32 Award winners and the students of the 2024 NSTF Brilliants Programme. The purpose of the initiative was to inform and motivate students in their studies and future STEM careers. (STEM = science, technology, engineering and mathematics.) These science role models addressed a variety of topics that inspired and motivated the students, equipping them to confidently tackle the challenges of higher education.

The six distinguished speakers made a lasting impact on the students' lives as they presented the following thought-provoking talks:

1. **Navigating the transition: Insights and strategies for success in university STEM programmes:** Prof Tebogo Mashifana, Associate Professor and Head of the Department of Chemical Engineering Technology at the University of Johannesburg (UJ); and 2024 Emerging Researcher Award winner, reflected on her own journey growing up in a small village in Limpopo, and going on to pursuing her dream of becoming a doctor, despite financial constraints. She related that she received a bursary that funded her studies throughout university. She made the point that each student is indeed 'a drop in the ocean' as there are many other learners that will never have a similar opportunity to the Brilliants, where they've done so well and thus been supported through bursary funding.

   Prof Mashifana emphasised the importance of pursuing STEM careers, not just because it is 'cool,' but because there is an urgent need for innovative solutions to global challenges such as pollution, climate change and the energy crisis. "There's an urgent need for you to be doing what you are doing. There's an urgent need for you to get to the other side, and begin to contribute to some of the pressing challenges that we are experiencing in our world." She encouraged the Brilliants students to persevere through challenges, such as financial constraints, and to seek solutions rather than give up. She also acknowledged that entering and completing STEM programmes can be challenging, but that it is important to remain tenacious, and not give up.

   She discussed the various challenges that students face when transitioning from high school to university, such as, the struggles of academic performance, social integration, mental and emotional health, access to resources, language barriers, and the need for effective time management and independence. She said that developing a strong support system and taking advantage of available mental and educational welfare resources that are freely available in the universities, are the best solutions to these struggles. She also stressed the importance of maintaining focus, recognising one's value, and striving for academic excellence, and always engaging with lecturers/tutors where one may be having difficulties grasping certain aspects in their studies.

   Prof Mashifana urged the Brilliants to prioritise their studies and not abuse their newly found freedom at variety. She also stressed the importance of choosing the right set of friends so that you do not lose your focus. "Ensure that you keep company that is aligned with what you came to do" she said.

   She concluded: "Recognise that you are special for you to be in the NSTF Brilliants Programme, and not everyone who is clapping with you and for you wanted to see you succeed. That is the reality. So, you need to be intentional about staying away from distraction."

2. **Science on the edge: an exploration:** Prof Ivy (Igle) Gledhill, Visiting Adjunct Professor of the School of Mechanical, Industrial and Aeronautical Engineering at the University of the Witwatersrand (Wits) and first recipient of the new 2024 Science Diplomacy for Africa Award. Prof Gledhill talked about her 'unconventional path' and diverse experiences in academic research and industrial applications. She discussed her work in plasma physics, aerodynamic prediction, and computational fluid dynamics, as well as her involvement in major projects, addressing problems such as mine explosions, the HIV epidemic, and protection of the eyes of aircraft pilots.

   She stated: "I was increasingly concerned about the global crisis of HIV, and I was thinking about how a computational physicist can get involved to contribute to a solution." Prof Gledhill talked about her work with the International Union of Pure and Applied Physics (IUPAP) and the International Science Council's working group of women in science. Their research works to help address the gender gap in science and the vulnerability of the African continent to the effects of climate change. She also shared that she had to overcome imposter syndrome, and keep on striving to succeed, early in her career, while working with other brilliant scientists at Rhodes University (RU).

   Prof Gledhill explained that there is an urgent need for climate finance, for climate change action and sustainable development – especially in Africa, because we are the most vulnerable and consequently, the least adaptable to the effects of climate change. She stressed the need for collaboration with lawyers, global financiers and scientists in addressing climate change. Prof Gledhill discussed the need for mission-led science and transdisciplinary engagement to address questions related to sustainability. She posited: "Mission led science is the new model; you need to pull in all stakeholders, not just [those] in the sciences."

   She emphasised the need for additional mechanisms beyond traditional science models for funding and undertaking science for the Sustainable Development Goals (SDGs). Prof Gledhill discussed the power of deep and superficial knowledge in addressing complex questions and harnessing the power of mission-led science.

   "You can have deep knowledge in your specialist area, but [you need to have] enough superficial knowledge to talk with other people in order to address a question."

   She also highlighted the importance of lateral thinking, creativity, and the need for scaling up investment in science to support transdisciplinary and engaged mission science for sustainability.

3. **Leveraging networking and collaboration for career growth:** Mr Leo Chilcane, Manager of the uLwazi Node; and South African Environmental Observation Network (SAEON) Open Data Platform, at the National Research Foundation (NRF), addressed the students. The uLwazi Node is the 2024 Data for Research Award winner. He explained that he aptly entitled his talk 'Leveraging Networking and Collaboration for Career Growth' because that is what propelled him throughout his career. Mr Chilcane emphasised the importance of avoiding complacency and asking for help while in university. After receiving an internship offer, he learned the value of mentorship and building relationships, which eventually led him to his dream job as a Geographic Information Systems (GIS) consultant. However, Mr Chilcane found himself no longer interested in this field, which he had once considered his ideal job. "One of the things I had to overcome was the fear of change," he declared.

   He discussed the importance of collaboration in his career progression and how it led him to take on a leadership role at uLwazi Node at a young age. He also highlighted the various opportunities in the research and development (R&D) and open science space, emphasising that the Brilliants students need to acquire interdisciplinary skills. He stressed the importance of coming out of your comfort zone to pursue new opportunities, keeping an open mind. He shared practical tips such as setting boundaries and focusing on the end goal when starting activities. Mr Chilcane advised the Brilliants to always remain attentive with others, do every task to the best of their ability and most importantly, that they should never be afraid of failure. He also underscored the importance of personal well-being, including reading, experiencing new things, physical activity, and getting enough sleep.

   He concluded: "Something that's overlooked in STEM is the development of soft skills. Communication! Speak up when you're in the room, be visible, try not to leave a discussion without putting out a word or two."

4. **Opportunity and opportunity cost:** Prof Emmanuel Iwuoha, Research Chair for Nano Electrochemistry and Sensor Technology; and Professor of Chemistry at the University of the Western Cape (UWC); and Founder and Director of the UWC Sensor Laboratories (SensorLab); and 2024 Engineering Research Capacity Development Award winner, discussed concepts of opportunity and related cost. He began his talk by referring back to Prof Mashifana's point about not letting your upbringing or surroundings define you. Prof Iwuoha mentioned three opportunity differentiations, stating: "I look at opportunities that come in the form of prevailing circumstances; the opportunities that come in the form of the things we desire or ambition or vision; and then the opportunities we engineer ourselves." He highlighted the importance of taking the initiative of finding information, and seeking out opportunities for oneself. He said: "We have to begin to think in terms of curating, not only consuming opportunities, but we have to also create. And whenever we create opportunity, it adds value to society." He mentioned four gains from creating opportunities for oneself saying that it helps to build one's confidence, it motivates to want to achieve more, and it gives you a life purpose, grounding one's sense of self.

   Prof Iwuoha said that after creating opportunities for themselves, the Brilliants students should work on creating opportunities for other youths who are not afforded the privilege of receiving tertiary education, calling on a leadership role to help combat unemployment and poverty. He mentioned that only 11.6% of individuals between 18 and 25 are receiving tertiary education, and that the South African government allocates 6.06% of its budget towards them. "The country is entrusting its future into your hands because the life of the country depends on you," he stated. He urged the Brilliants students to be role models and maintain moral authority, excellence, humility, competence, integrity, and influence as future leaders.

   Prof Iwuoha also shared about his work in developing materials for sensors, disease diagnostic sensors, and TB diagnosis. He reflected on the successes of his research centre at UWC Sensor Laboratories, and how it gradually developed, through his leadership and him being an ambitious self-starter. "Use the university as a fulcrum to do whatever you want to do. You have to create something, add value to the university."

   Prof Iwuoha concluded, assuring the Brilliants that it is completely normal to feel lonely sometimes as exceptional individuals who are driven by the need to employ complex, analytical approaches to problem-solving. Such approaches are crucial for the world to change for the better.

5. **A journey into 2034:** Prof Patience Mthunzi-Kufa, Research Group Head for Biophotonics at the Council for Scientific and Industrial Research (CSIR); and Professor Extraordinarius at the University of South Africa (UNISA); and 2024 Researcher Award winner, began by encouraging the Brilliants students not to take for granted, the opportunity to learn from the motivational talks and the successful role models. Prof Mthunzi-Kufa shared her journey from childhood, her upbringing by a single mother, her schooling, challenges finding a place at university, and her career in research. She talked about having to overcome language barriers when she was studying at the Rand Afrikaans University (now UJ). She encouraged the students to consider the possibilities of leading in the teaching of science in South African native languages, in the future. Prof Mthunzi-Kufa discussed her experiences in the field of medical biochemistry and transitioning to establish a multidisciplinary biophotonics laboratory. She strongly stressed to the students the importance of perseverance and mentorship.

   Prof Mthunzi-Kufa encouraged the students to embrace opportunities to travel and study abroad after sharing about an opportunity she got early in her career at the CSIR, to travel to the University of St Andrews in the United Kingdom (UK). She shared her experience of studying and working in physics, becoming a TED Talk presenter, doing international interviews, supporting outreach and school visits, and being honoured by the Department of Basic Education (DBE). She stated: "When I work, I don't want to be given acknowledgement or to get recognition, but there are people that are watching and they will appreciate [what I'm doing]."

   She also talked about the potential applications of her work in health and pharmaceuticals, such as creating a smartphone-based lab for diagnostics and using photonics for bulk screening of medications. Prof Mthunzi-Kufa emphasised the importance of giving back to the community and encouraged the students to consider providing tutorship and mentoring others to pursue careers in science. She said: "I come from Soweto so I do a lot of outreaches at schools. I do realise that the teachers need that type of support. If as scientists, we can get time to support them, we should do that". "Don't just focus on developing yourself, focus on developing others", she stated. She also shared her vision for the future, emphasising the need for foresight in one's career journey.

   Prof Mthunzi-Kufa introduced the Brilliants to the concept of 'future back-thinking', which involves developing a vision and translating it into a future strategy, with an emphasis on assumption and discovering what could be true. When preparing for the future, you should rely on your inbuilt navigation system, conduct research, put plans in writing, and be multidisciplinary.

   She advised that it's important to write out your vision, your own manifesto, as a future leader, to push yourself to achieve it. In the STEM field, it is crucial to not allow anyone to define your limits, develop meaningful relationships by networking, and stay open-minded. She concluded, "In STEM, there is nothing like a glass ceiling. I do not know a glass ceiling because I just stretch myself."

6. **Lifelong learning, the scientific experience:** Prof Nozipho Ngakaile, Chairperson: Board of Directors, Nuclear Medicine Research Infrastructure (NuMeRI); and Nuclear Medicine Physician at Jack Persad and Partners Inc. NuMeRI is the 2024 Innovation Award: Corporate Organisation winner. She discussed her personal journey towards becoming a nuclear medicine physician. She reflected that despite early aspirations to become a doctor, her path was not straightforward. As she had not initially received the necessary marks to qualify to study medicine, she pursued a BSc qualification, and eventually worked for nine years to become a doctor. She then discovered her interest in nuclear medicine and became a nuclear physician through perseverance and determination. Prof Ngakaile encouraged the Brilliants students to pursue their dreams and collaborate with others in similar fields. She discussed the different opportunities in nuclear medicine, including working in the public or private sector, and emphasised the importance of networking and collaboration in the scientific community. She encouraged them to: "keep going, keep moving, collaborate, do research, do more service-related things."

   Prof Ngakaile shared the challenges she had to face while growing in the field of nuclear medicine, mentioning the gender biases that women face, such as being the last to be considered for funding. She stressed the importance of continuous learning and mentorship to advance in any field. She also encouraged the young scientists to be fearless, dynamic and multi-faceted, learning many other strengths to rely on to succeed. She advised the Brilliants not to ever become discouraged by failures or delays in their set out plans/career goals. Prof Ngakaile urged the students to remain open-minded to different opportunities, bearing in mind that their STEM career paths may not lead to research or academia but instead, careers in industry. She stressed that they must know who they are, know their niche and passions and work at that, at their own pace, never competing with anyone else.

   She urged the Brilliants to constantly strive to accomplish something new. "Every time you achieve something, you have to move on to the next thing," she stated. She urged the Brilliants to be unafraid to speak, put themselves out there and allow themselves to be uncomfortable as they grow their own network links. She concluded: "Be visible. You must be a brand."

The NSTF Brilliants Programme is sponsored by the DSI and the South African Council for Natural Scientific Professions (SACNASP). A partnership with the London International Youth Science Forum (LIYSF) ensures that a few of the Brilliants students could attend a two week programme in London.

For a more in-depth exploration of motivational and inspirational conversations with award winners and their interactions with Brilliants students, be sure to visit the NSTF YouTube channel.

Join the NSTF's conversations on social media:

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- LinkedIn: National Science and Technology Forum (NSTF)
- YouTube: National Science and Technology Forum (NSTF)
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About the NSTF

The National Science and Technology Forum (NSTF), established in 1990:

- is a broadly-representative stakeholder body for all science, engineering and technology (SET) and innovation organisations in South Africa
- gathers stakeholders around burning issues of national and global interest, across the public and private sectors, including matters of public policy
- includes a network of professional societies in SET and STEM education (STEM = science, technology, engineering and mathematics) - the NSTF proSET membership sector.
- recognises, awards and profiles the outstanding contributions of individuals and groups to SET and innovation through the prestigious NSTF Awards
- runs and supports collaborative projects and youth outreach, including recognition of top performance in mathematics and science, low modelling, bursary and STEM career information
- runs and supports the STEMulating which attracts youth and educators to Explore-Discover-Learn the world of STEM including careers. (Established by NSTF proSET)

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Non Profit Company Registration Number: 2007/029165/08
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