

# ANNUAL REPORT

2021-2022

[www.saip.org.za](http://www.saip.org.za)

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# Table Of Contents

01	Preface: 2021-2022 Annual Report
02	Message from SAIP President
03	Strategic overview and goals reached
04	Projects: impact summary
05	Projects: infographic
06	SAIP elected personnel
07	SAIP council and structures
08	SAIP office personnel
09	Financial results
10	SAIP services

# Excellence Despite The Odds

***“As a voluntary organisation implementing our projects would not be possible without the support of our members and volunteers who give up their time to implement the various SAIP developmental projects.”***

This annual report outlines our performance on the targets we set. The report gives you, as our stakeholders and the physics community, insight into the performance and achievements of the SAIP. Our primary objective for the financial year was to maintain our short to medium-term goal to improve the physics education pipeline. We are elated that this objective was achieved despite the constraints presented by the COVID-19 pandemic. To improve the physics education pipeline, several projects were implemented, including conferences, webinars, physical science teacher development, learner support programmes, and projects geared towards supporting women and girls in physics. In alignment with the International Year on Basic Science for Sustainable Development, outreach activities were conducted to improve public understanding of physics. Our primary objective for the financial year 2021/2022 was to maintain our short to medium-term objective of improving the physics education pipeline. We are glad that this objective was achieved despite the constraints faced due to the COVID-19 pandemic. Several projects were implemented towards this objective these include conferences and webinars, physical science teacher development, learner support programmes, supporting women

and girls in physics, and outreach and public understanding of physics, especially those geared toward the International Year on Basic Science for Sustainable Development.

Innovation and strategic partnerships remain critical to attaining our mission as an organisation, we would like to thank our core partner and sponsors, the Department of Science and Innovation (DSI), Allan Grey Foundation, and other partners that contributed financially to the success of the SAIP public benefit activities. As a voluntary organisation implementing our projects would not be possible without the support of our members and volunteers who give up their time to implement the various SAIP developmental projects.

SAIP is committed to being a world-class physics institution and professional body. We have learned over time that market leadership requires constantly rethinking engagement methods and programme solutions. Therefore, innovation and strategic partnerships remain critical to attaining our mission as a voluntary organisation.

We would like to thank the Department of Science and Innovation, Allan Grey Foundation, our partners, and sponsors that continuously contribute to the success of SAIP public benefit activities. We are forever grateful to our partners, council, divisions, volunteers, and members who went the extra mile to ensure we reach our goals as we continue to monitor and improve our four strategic focus areas:

- 1) Physics education and training
- 2) Physics research and innovation
- 3) Nurturing and developing professional physicists
- 4) Transformation, gender, inclusivity, and diversity





## A Message From The President

*“We need to chronicle untold stories and celebrate teachers whose passion makes up for the lack of resources. As Chinua Achebe puts it, until lions have their storytellers, hunters will always be the hero in their stories. We need to name the nameless in our villages and townships who are innovative and recognise that physics is part of day-to-day life.”*

## Physics is Central to Development

It is a great privilege to share my thoughts with our key stakeholders and the physics community. Before I comment on the solid progress we made in the past year, I would like to commend everyone who, when the COVID-19 pandemic hit hard, stood up and faced the insurmountable odds on our path to greatness. Physics is central to development. Our licence to exist is multi-fold. We have a mandate to advance the physics agenda; we are the voice of physics and see to the development of physics in South Africa and represent its affairs internationally with pride. SAIP's clear vision and purpose for society are my smile keepers, especially considering that this year is the centenary year of physics in Africa. With the theme: past, present, and future, and looking at the continent's context within that theme.

We need to chronicle untold stories and celebrate teachers whose passion makes up for the lack of resources. As Chinua Achebe puts it, “until lions have their storytellers, hunters will always be the hero in their accounts.” We need to name the nameless in our villages and townships who are innovative and recognise that physics is part of day-to-day life. Youth unemployment is a significant issue in our country. As a community, we need to invest more in transferable skills. Our youth development programmes need to develop and equip our young people with skills that will enable them to survive. The world and workplace need students with relevant educational experiences that nurture their passions, problem-solving abilities, and higher-level thinking skills and critical thinking. Teachers are catalysts for developing confident and competent learners. The key to producing future physicists lies in supporting and

capacitating teachers with tools that will enable them to do so. The SAIP's Teacher Development workshops are an enabler for that. It is important to note that teachers now get Continuing Professional Development Points from attending our workshops. These workshops help improve teaching-learning situations and update modern instructional devices, thereby inspiring them to become better at their trade.

SAIP is celebrating 67 years of existence this year. During this time, the SAIP has grown into a strong organisation that is able and agile enough to serve the needs of its stakeholders. We have excellent and well-established governance systems that enable us to operate efficiently. Our various academic events, such as conferences or seminars, may have shifted in response to circumstances but remain a fixture on our national physics calendar. The saying that ‘the ultimate measure of a man is not where he stands in moments of comfort and convenience, but where he stands at times of challenge and controversy’ feels appropriate for our current operating environment. The people in our group have exceeded my expectations in dealing with this crisis. Thank you to the different structures of SAIP, the council, executives, and operational personnel who made many sacrifices to ensure we could remain active during the most challenging period.

*Makaiko Chithambo*

**Prof. Makaiko Chithambo**

President of the South African  
Institute of Physics

# Strategic Overview: Investing In The Future Of Physics

*“South Africa came to the party at the heightened period of COVID-19 pandemic, we fully participate in the fourth industrial revolution (4IR) through our world-class, cutting-edge research.”*

*“Physics discoveries in areas such as smart materials for sustainable energy, advanced imaging techniques, big data analytics, machine learning and artificial intelligence are the key cornerstones of the Fourth Industrial Revolution(4IR) and are at the frontiers of current technological research.”*

Why physics? Why invest in its development and future? As the most basic of sciences, when exploited strategically, physics can do a lot for the development of South Africa and its economy. Physics can enable the country to fully participate and take advantage of the fourth industrial revolution (4IR).

As the most basic of sciences, when exploited strategically, physics can do a great deal for the development of South Africa and its economy. Physics can enable the country to fully participate and take advantage of the Fourth Industrial Revolution (4IR). Physicists make fundamental discoveries whose applications and exploitation have significantly addressed global challenges, including the United Nations Sustainable Development Goals (SDGs). South Africa has witnessed a dwindling number of women and learners from disadvantaged communities participating in physics.

This trend starts at the basic education level till the university level. It then leads to a small number of physicists in the economy, weakening the whole science, engineering, and technology (SET) system. If South Africa wants to improve its SET landscape and increase human capital in SET, we need more young people to study and pass physics in high school. Despite challenges, South Africa rose to the occasion during the heightened period of the COVID-19 pandemic.

We fully participated in the 4IR through world-class and innovative research. We can build on the knowledge and expertise gained through that period to address fundamental and systematic challenges in the education system. SAIP seeks to achieve this through projects implemented in its strategic focus areas.

## SAIP Strategic Focus Areas

01

### Teacher Development Programme

Following concerns raised by heads of departments regarding the dwindling number of students studying physics at the tertiary level. The SAIP commissioned the review of physics training in South Africa. One recommendation of the report was the establishment of the SAIP Physical Science Teacher Development Programme, which aims to improve critical skills identified as lacking in the National Senior Certificate Diagnostics Report. The South African Council now accredits the programme for Educators (SACE), and teachers who attend it receive CPD points. In 2021/22, the SAIP trained over 480 educators from 238 schools across various parts of the country to participate in the hybrid workshops. For the year ahead, SAIP is planning to reach 500 teachers.

02

### Research and Innovation

The SAIP understands that research and innovation are essential and that today's physics influences future technology. SAIP reviews and participates in the research agenda through different programmes. For example, SAIP participated in the transition of the National Institute of Theoretical Physics (NITheP) to the National Institute of Theoretical and Computational Sciences (NITheCS), establishing the SA Biophysics Initiative and the programme on Entrepreneurship for Physics.

03

### Nurturing and Developing Professional Physicists

The SAIP also aims to develop and nurture an inclusive next generation of physicists for South Africa through various initiatives such as mentoring opportunities, conferences, and schools. SAIP provides a platform for the professional development of the youth and continuous professional development for physicists.

04

### Gender Inclusivity

Through WiPiSA, SAIP has launched several empowerment initiatives for girls at primary, high school, and undergraduate levels. In August 2021, WiPiSA opted for alternative means of community engagement. These included radio, TV, social media, print and electronic media to attract more women to pursue careers in physics and girls to study physics. Twenty-three women were profiled, with a combined reach of over 7.6 million people. In addition, there were webinars scheduled for the whole of August month with women presenting their projects and live experiments. SAIP further developed a teacher training module to improve teaching techniques to be gender friendly and attract and retain girls in physics. The module was delivered to over 480 teachers nationwide participating in the SAIP physics teacher development programme.



05

## Diversity

The SAIP is an organisation that is rooted and united in our diversity; our mission is to have an inclusive growing organisation that brings everyone part of the table, regardless of race, ethnicity, age, sexual orientation, religion, marital/parental status, gender identity, nationality, and more. That principle is applied through recruitment, retention and impact work.

Key to what has consistently kept SAIP moving over the past 67 years, is the belief that the future of physics needs to be anchored in sustainable human capital development in problem-based training, coupled with accessible innovation-focused research infrastructure and programmes.

## Long-Term Strategic Focus

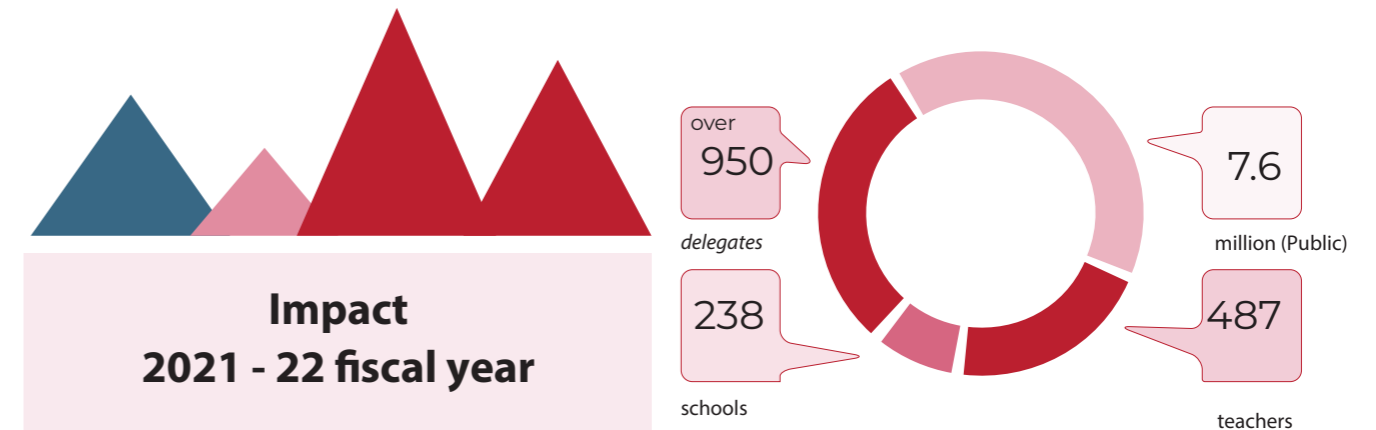
In the long term, the SAIP would like to see physics take on a meaningful role in the innovation and development of South Africa. We have seen how physics discoveries from the South Africa-CERN collaboration programme led to the advancement of big data analytics. Machine learning (a form of artificial intelligence that makes predictions from data) and artificial intelligence technology transfer are now applied in modelling the COVID-19 pandemic. It contributed to establishing the COVID-19 dashboard to provide valuable recommendations to policymakers in the country.

Another example is South African Blue Skies physics research, which resulted in advanced image processing techniques developed for aurora research that are now applied in the early detection of wildfire smoke and has saved South Africa billions of rands and protected the environment.

The physics of today is the technology of tomorrow.

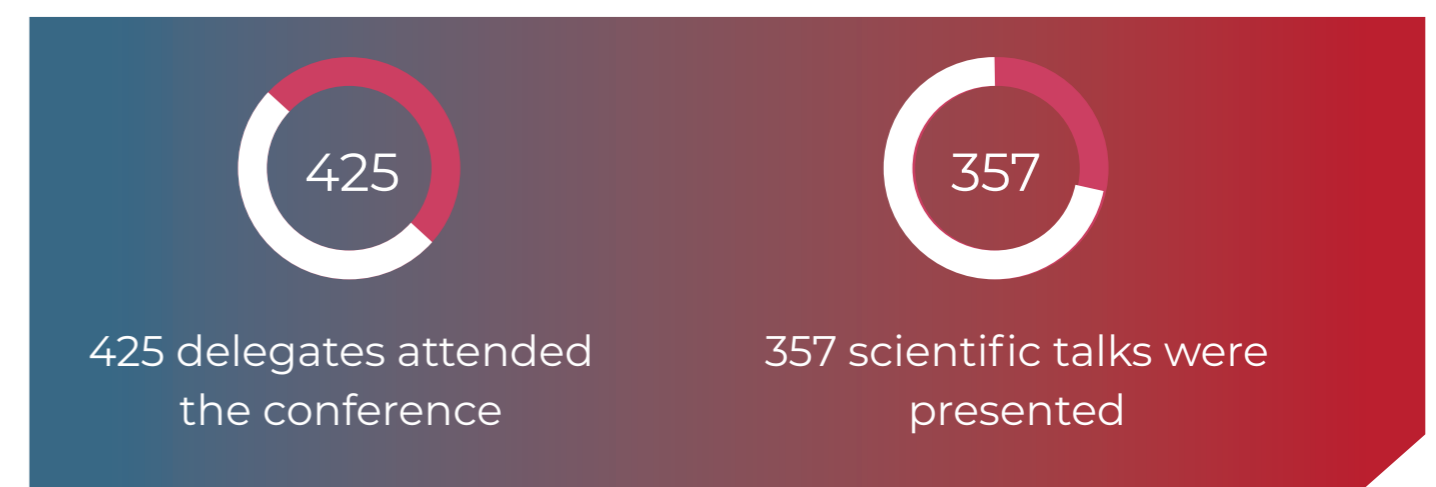
## Our Impact

Against challenges brought by the COVID-19 pandemic, SAIP contributed significantly to science development in South Africa in the 2021/22 fiscal year. Over 950 delegates participated in SAIP-organised conferences & webinars. Through a month-long public relations campaign initiated by WiPiSA during Women's Month, over 7.6 million people were reached through radio, TV, online, and print publications. In addition, 487 physical science teachers were trained, and 238 schools were reached with essential skills for matric resources. These contributions are summarised in this section.



## Workshops

The SAIP's main academic event, SAIP2021 was held virtually, and 425 delegates attended the conference where 357 scientific talks were presented. The proceedings of the event are available here: <https://bit.ly/3dHdcJl>



The SAIP also helped host other virtual conferences such as the African Light Source Conference 2021 and several SAIP weekly webinars that promote human capital development and knowledge dissemination, these had combined participation of over 500

# Outreach

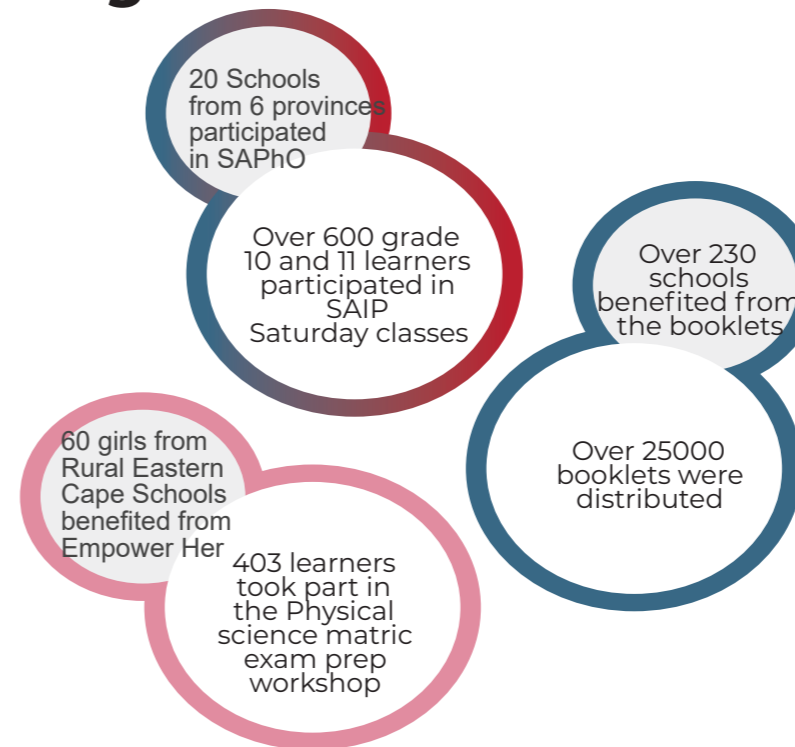
SAIP was actively involved in school outreach and public understanding of physics through various channels. During the National Science Week (NSW) 2021, the SAIP started working on activities towards the International Year of Basic Science (IYBSSD2022) and 100 Years of Physics.

During NSW2021, the SAIP also organised a “Physics in my Village Competition”, aiming for high school learners to identify how physics is applied in their communities. Learners were able to tell a story about physics around them and its impact on their community through mini video clips and posters. The top six winners were chosen, including several encouragement prizes; the winning entries are available here: <https://bit.ly/3K7YveU> Outreach.

During NSW2021, SAIP also developed a documentary, “Physics in our everyday life” background to this documentary is that most people do not realise how physics discoveries help in our daily life. The documentary tells a story about “Physics Benefits in South Africa” that relates to everyday life and resonates with the South African community. The documentary’s content has two broad focuses: issues related to the ordinary person on the street and advanced research and its impact on improving the quality of life. View the video here: <https://bit.ly/3K7YveU>

Given the IYBSSD2022 and 100 years of Physics, the SAIP also started a project on 100 years of Physics in Africa – ‘Past, Present and Future.’ There are many beautiful and inspiring stories on how physics is thriving, changing lives, bringing development, and impacting various parts of Africa, even producing world-class research and physicists with bare minimum resources. Still, the world never hears of these incredible success stories from Africa. An African proverb says, “Unless the lion tells the story, the hunt will always favour the hunter.” This project aims to give a chance to Africans to tell their physics stories and share them with the world; more details are available here: <https://bit.ly/3c8kSEj>

# High School Learner Support



The SAIP also participated in activities supporting high school learners. These school intervention activities include the following

The SAIP also participated in activities supporting high school learners. Over 600 grade 10 and 11 learners participated in the SAIP-organised Saturday classes aimed at bridging the gap caused by the COVID-19 pandemic and trimming the school curriculum. Due to time constraints related to the COVID-19 pandemic, some topics in grades 10 and 11 were cut off the syllabus and not covered in school. However, these skipped topics are essential for a good learner foundation, content progression to grade 12, and in preparation for the matric examination. In addition, the poor foundation caused by trimming will affect the learners even at the university level because the university curriculum assumes that such foundational concepts were covered in school.



Mr Netsianda distributing matric resources at J.S van Der Merwe Technical High School.



**ESSENTIAL SKILLS FOR MATRIC**  
A PARTNERSHIP WITH DR DEREK FISH

**1** 500 USB STICKS

**2** 20 000 BOOKLETS

**3** 2 952 ACCESSED MATERIAL ONLINE

To bridge the COVID-19 content gap in physical science, the SAIP, in partnership with Moipone Science Centre and consultations with Physical Science Subject advisors from Ekurhuleni, ran an online Saturday school supporting grades 10 and 11 to teach learners in foundational and content progression physical science topics they have missed.

About 403 learners participated in the Physical Science Matric Exam preparation workshops, which were held in collaboration with Moipone Science Centre. The workshops aimed to prepare the matric class of 2021 for the National Physical Science Exam by giving skills identified as lacking in school systems from the annual National Senior Certificate Diagnostics Reports. Over 230 schools in nine provinces benefited from distributing the 'Essential Abilities for Matric' booklets. Over 25,000 booklets and 1,500 USBs were distributed. The resources were also made available online <https://bit.ly/3AD1FnI>.

The SAIP hosted the South African Physics Olympiad (SAPhO) 2021. About 400 learners from 20 Secondary schools in 6 provinces participated in SAPhO 2021. The report is available here <https://bit.ly/3Ac7Ldj>.



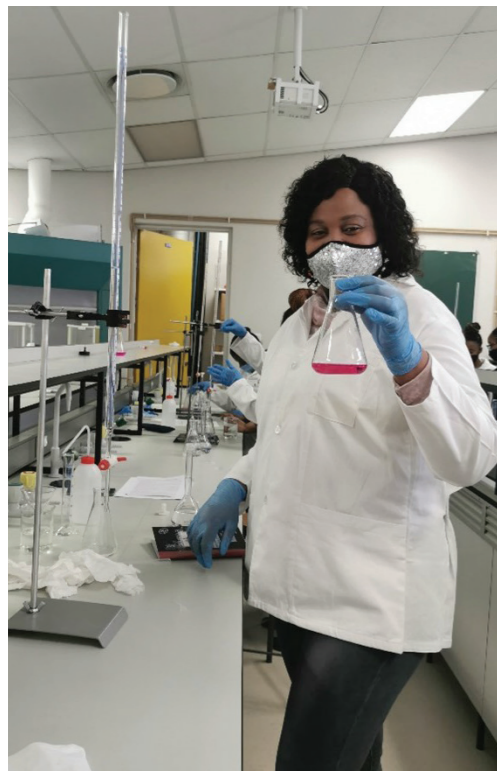
From left to right: WCED Science Advisor: Nicolette Hoffman, Vusi Mngomezulu of Allan Gray, Derek Fish of UniZulu Science Centre and Peter Horszowski of PERT Industrials after attending and addressing the teachers at the Ottery Youth Centre in Cape Town Essential Skills for Matric Teacher Workshop held on 8 October 2021.



Teacher workshop in Cape Town: Left, Mr Netsianda from the University of Limpopo distributing books to Tubake High School matriculants and their teachers



# Teacher Development



SAIP- Central University of Technology, Free State (CUT), Bloemfontein October 2021 teacher workshop chemistry practical session.

Teachers during the Bloemfontein October 2021 physics practical session



SAIP- CUT Bloemfontein, October 2021 Teacher Development Workshop, Dr Lordwell Jhamba from the University of Venda facilitating a physics session.

In 2021 the SAIP Online Physics Teacher Development mode was accredited by the South African Council of Educators (SACE), the statutory professional body for educators in South Africa. Hence teachers will now accrue Continuous Professional Development Points (CPD) whenever they attend the online SAIP Teacher Development workshops. The SAIP, in collaboration with the Central University of Technology, University of Venda, University of Johannesburg, Moipone Science Centre, and other stakeholders, ran a series of Physical Science teacher development workshops. SAIP received financial support from the Philanthropy Initiative with employees of Allan Gray. Workshops were held in Gauteng, Free State, Limpopo, KwaZulu Natal, and Eastern Cape. Over 487 teachers participated in the workshops.



Ekurhuleni Moipone Academy Saturday Online Workshop



CUT Welkom October 2021 chemistry practical session.





CUT Welkom October 2021 chemistry practical session.



Vhembe February 2022 Teacher Development Workshop, chemistry practical sessions at Vuwani Science Resource Centre.



Mr Netsianda from the University of Limpopo facilitating a physics session at the Vhembe February 2022 teacher workshop.

# ONLINE TEACHER DEVELOPMENT WORKSHOPS

RESULTS IN NUMBERS



**4000**

Over 4 000 teachers were registered



**230**

About 230 teachers attended the Vhembe 2020 workshop



**60**

Over 60 physical- science teachers in the Eastern Cape were trained in 2020



**213**

The 2021 edition of the Vhembe workshop saw 213 teachers attending the workshop.



# Women in Physics in South Africa (WiPiSA)




## #BeDriven Onesimo Mtintsilana

Currently pursuing her PhD in Higher Energy Physics with University of Witwatersrand

**on #TheGlenzitoSuperDrive  
Wednesday | 25 August 2021 | @16h40**

[Twitter](#) [Instagram](#) [Facebook](#)

@Radio2000za

The SAIP recognises that physicists do not operate in isolation from the societal issues that lead to the exclusion of women in economic participation. Agendas four and five of the Sustainable Development Goals (SDGs) encourage us to push toward a more inclusive society concerning education and gender equality. Despite the COVID-19 challenges, WiPiSA has led the way in stimulating and increasing interest in physics among girls and women through outreach programmes, seminars, mentorship programmes, participation at industry events, public relations, and stakeholders' engagements.

Due to COVID-19 restrictions, in 2021, WiPiSA could not host physical outreach programmes and face-to-face engagements or mentoring programmes. Therefore, WiPiSA launched the following online outreach programmes:



**Mdantsane FM 89.58**

**RADIO INTERVIEW**

**WiPiSA**

20 April 2022  
9:30am

Guest  
Onesimo Mtintsilana



**WiPiSA**

Join us as we explore the balance between careers in STEM and family. We will also be joined by guest speakers who have found success in both.

Hosted by  
Mpendulo Sibiya

## Love & Science

How do you keep the balance?

Date: 25 February 2022  
Time: 6 pm  
Platform: Zoom

register now:




NELSON MANDELA UNIVERSITY SOUTH AFRICAN INSTITUTE OF PHYSICS

100 years of Physics in Africa Past, Present and Future

Date: 4-8 July 2022

Gqeberha formerly Port Elizabeth

ANNUAL CONFERENCE OF THE SOUTH AFRICAN INSTITUTE OF PHYSICS (SAIP 2022)




## WOMEN IN PHYSICS Beauty Shibiri

Occupation: Phd Candidate  
Highest Qualification: B. Sc (Hons)  
Institution: University of Limpopo (Materials Modelling Centre)

My research focuses on improving cathode materials through large scale atomistic simulation techniques that complement experimental approaches in the study of high-power lithium-ion batteries.

Word of encouragement: Success is lame, it does not care who gets to the finish line first; with those words and the Corona pandemic being a stagnation in so many areas of our lives today, never ever give up on your dream: no matter how tough it gets.




## Catch Ms Shozi @Jozi FM

[www.jozifm.co.za](http://www.jozifm.co.za)

Date: 13 August 2020  
Time: 8:00am

Who said teachers can't be Physicists?

**Nolwazi Shozi, University of Zululand**  
HIGH SCHOOL TEACHER AND MSc CANDIDATE

[Women In Physics In South Africa](#) [@SAIP](#) [sainstituteofphysics](#)



## SABC NEWS CHANNEL:404

### A LINEAR TRANSFORMATION IN PHYSICS

10 AUGUST 2020  
FROM 9:30 AM

**DR Buyisiwe Sondezi**  
Senior Lecturer, University of Johannesburg

[Women In Physics In South Africa](#) [sainstituteofphysics](#) [@SAIPhysics](#)



Lexia Naidoo

"Imagination is more important than knowledge. Knowledge is limited. Imagination encircles the world"- Albert Einstein

Radio Interview!

Miss Naidoo is an MSc student at UKZN and a student intern at SAIP. She enjoys both science and art.

**You FM**

Time: 15.40  
Date: 19 Aug 2021

[Womeninphysicsa](#) [@saiip](#) [Sainstituteofphysics](#)



Mpendulo Sibiya

I enjoy networking and helping people. I am a founder of the Sibiya na Langa program that helps people with jobs, bursary and university applications.

Radio Interview!

MSc student: University of Western Cape

**SABC AFRICA**

Time: 1.30 pm  
Date: 20 Aug 2021

[Womeninphysicsa](#) [@saiip](#) [Sainstituteofphysics](#)



# Women's Month: Career in Physics



# Teacher Module on Attracting and Retaining Girls in Physics

SAIP developed a training module for improving teaching techniques to be gender friendly and to attract and retain girls in physics. The module was delivered to over 487 teachers who participated in the programme.

## WiPiSA Lunches

SAIP initiated an idea to have departmental lunches across universities within South Africa. The luncheons brought together women from academic leadership roles and students (undergraduates and postgraduates). The aim was to enjoy meals while networking, encouraging and stimulating interest in others to study physics, and talking about challenges they are experiencing or have encountered. A total of 80 participants from four different universities attended the lunches.



*Astronomy in Colour (AiC) virtual talks project.*





# WiPiSA 2022 General Webinars and Fun Night Quiz

WiPiSA hosted two webinars and a 'Big Quiz Night'. The first webinar celebrated the International Day for Women and Girls in Science and was organised to honour young aspiring scientists. The second webinar concluded the Month of Love by discussing "Work-Life Balance in STEM Careers: Addressing Negative Preconceptions." The two webinars and the quiz attracted 100 participants and had a Facebook reach of 523.



## Empower Her

An Eastern Cape-centred programme focused on empowering and encouraging girls from rural areas to study physics, computer science and coding. The programme provides hands-on physics experiments, software coding, a virtual tour of the Large Hadron Collider at CERN, and career guidance. Four primary schools were targeted, and 60 learners participated in the programme.

**EMPOWER HER**

THIS PROJECT WAS CONDUCTED IN EASTERN CAPE

VIRTUAL TOUR OF THE LARGE HARDON COLLIDER AT CERN

TO ENCOURAGE GIRLS IN RURAL AREAS TO STUDY PHYSICS, COMPUTER SCIENCE AND CODING

63 LEARNERS BENEFITTED

Through webinars and on-the-ground activities, reach out to rural areas and locales to teach girls in grades 8-11 about the value of being actively involved in physics and science through practical experiments and exercises.



Learners from Vulindlela Primary School (left) and Mbashe Primary School (right) using instructions to cut out pieces for arm robot.



Arm Robots assembled by Vulindlela Primary School learners.



Learners from Mtintsilana Primary School presenting their Hydraulics Arm Robots.



# A Gender-Transformative Approach to Physics Curricula Experiments

SAIP distributed learning support materials for grade 7 to 12 CAPS curriculum to 35 schools in various parts of the country. The project aimed to stimulate the learner's interest in physical science and encourage them to choose it as a core subject. The second objective was to make physics curricula more gender friendly by having both female and male physicists perform experiments in a fun and friendly manner. Primary and high schools located in previously disadvantaged areas and those with low pass rates in the national exams were targeted. About 21 experiments were performed and distributed to schools on a USB drive.

WiPiSA, in partnership with the Department of Basic Education and the Limpopo-based Vuwani Science Resource Centre, hosted an insight-sharing and interactive workshop in May 2021 at the Muofhe Graceland hotel, far from the University of Venda. The SAIP-funded workshop doubled as a fact-finding mission for WiPiSA, as it gained an understanding of factors that prevent female learners from studying and pursuing careers in physics. Learners from the local high schools, third and fourth year and honours students from the university's physics and chemistry departments, and female senior staff from mathematics, statistics, chemistry, and physics attended the workshop. Professor Natasha Potgieter, Chairperson of the interim faculty board at the Faculty of Science, Engineering, and Agriculture at the University of Venda, spoke about the lack of women in science, technology, engineering, and maths (STEM) fields. She also shared statistics on the number of females completing their postgraduate studies. Dr Tshimangadzo Sophie Mulaudzi from the Department of Physics at the University of Venda presented careers in science. Her presentation gave a broad scope of careers in physics and science skills.



Essential Skills Limpopo Distribution

She encouraged the attendants to know themselves by understanding their strengths and weaknesses and setting goals for a brighter future.

Former WiPiSA chairperson and associate Professor at the University of Limpopo, Prof. Sylvia Ledwaba, spoke about becoming intentional while encouraging participants to write down their short and long-term goals and schedule timelines that could enable them to track their progress. She urged the students to think out of the box and have self-esteem in pursuing their dreams. Another presentation was done by Prof. Regina Maphanga, Associate Professor at the Materials Modelling Centre, University of Limpopo, who spoke about the importance of women in science in the next-generation enterprise and institution clusters. She shared insights on the Council for Scientific and Industrial Research (CSIR) and the importance of this institution. She outlined the institution's strategic objectives to conduct research, development, and innovation of transformative technologies and accelerate their diffusion.

Many attendants interacted with the presenters, even though some were shy. Many expressed challenges that negatively impacted their studies, including

- Lack of financial support from home
- Family set-up (single parental care)
- Adaptation to different environments
- Mindset – Science is difficult

Participants were encouraged to be solution-driven and see themselves as victors against any odds they might face. This personalised session showcased the learners a culture of perseverance while pursuing their goals.

Participants were encouraged to be solution-driven and to see themselves as victors against the odds that they might face. This personalised session showcased to the learners a culture of perseverance while in pursuit of their goals.



Essential Skills Limpopo Distribution



Activity Name & Dates	Activity Goals	Reach/ Participants	Project Impact Highlights
<p>1 Essential Skills for Matric Distribution (Based on Skills identified as lacking in school systems from Annual Matric Exam Diagnostics Reports)</p> <p>August – October 2021</p>	<p>Bridge the digital divide during COVID-19 online learning regime by giving access to teachers and learners who cannot have online access to our resources</p> <p>Distribute printed booklets &amp; USB memory sticks with PDF materials and lecture videos on various physics topics</p>	<p>20, 000 booklets &amp; 500 USBs – distributed</p>	<p>Booklets were distributed in 6 provinces, Limpopo, Gauteng, KZN, Mpumalanga, Eastern Cape, and Western Cape, reaching over 240 schools.</p> <p>Materials were well received because teachers could play videos and go through booklets with students. The benefit of this method is that the lecture is available at any time.</p>
<p>2 Moipone Science Centre Matric Revision</p> <p>Preliminary Exam Preparation - 02 – 30 September 2021</p> <p>Spring Holiday Programme - 04 – 08 October 2021</p> <p>Final Exam Preparation -13 – 22 October</p>	<p>Prepare the Matric class of 2021 for National Physical Science Exam</p> <p>Drill skills identified as lacking in school systems from Annual Matric Exam Diagnostics Reports</p>	<p>Matric Learners from three Schools:</p> <p>Preliminary Exam Preparation: 192</p> <p>Spring Holiday Program: 139 Final Exam Preparation: 72</p>	<p>Learners benefit from the revision classes that help them prepare for the matriculation exams in 2021.</p> <p>Annual Matric Exam Diagnostics Reports were used in preparing the learners to answer exam questions and improve their understanding of physical science concepts.</p>
<p>3 Ekurhuleni Online Saturday School for Grade 10 &amp; 11 Learners - 4 September to 06 November 2021</p>	<p>To bridge the GAP caused by the COVID19 pandemic and streamline the school curriculum.</p>	<p>Over 600 Grade 10 and 11 learners</p>	<p>Grade 10 &amp; 11 online Saturday classes address the skipped topics and trimmed syllabus, foundational and content progress to grade 12.</p> <p>The project significantly improves physical science matric results and prepares learners for the University curriculum.</p> <p>In addition to the MS Teams platform, the learners can interact with facilitators during lessons and afterwards on dedicated WhatsApp groups.</p>
<p>4 Ekurhuleni Grade 10 &amp; 11 Physical Science Teacher Workshop</p> <p>13 - 14 October 2021</p>	<p>To provide teachers with the skills they need to prepare and equip learners with a solid foundation in physical sciences in preparation for Matric.</p>	<p>43 Teachers were trained</p> <p>28 Schools</p>	<p>Physical science educators thanked the SAIP for running a workshop that will benefit both the educators and learners through the skills they learned in the workshop.</p> <p>Teachers are equipped with the knowledge and skills needed to provide a good physical science foundation to grade 10 &amp; 11 learners.</p>



Activity Name & Dates	Activity Goals	Reach/ Participants	Project Impact Highlights
<p>5 SAIP 2021 Virtual Teacher Workshop 4 - 5 October 2021</p>	<p>1) Anywhere, Anytime Practical's  Anywhere Any time Practical's refer to practical work that can be done with minimal apparatus, anywhere and anytime. It can thus be a class group or individual activity, homework or online assignment. Experimental apparatus or requirements should be readily available.</p> <p>2) Preparing learners for the 4th industrial revolution  This theme involves more sophisticated technology-based applications, such as computer simulations, cell phone apps, robots, coding, computer-based measuring instruments, etc.</p>	<p>68 physical sciences teachers from 7 provinces attended the workshop</p>	<p>The workshop's mission was to facilitate and equip Natural and Physical Sciences Teachers in delivering the physics content from a disciplinary perspective, fostering a community of practice by teachers for teachers. This will, in turn, raise learner interest and retention in the sciences, increasing the mass of learners needed in the Sciences, Technology, Engineering and Mathematics (STEM) sector.</p> <p>The teachers participated in an activity in which they prepared, shared, and discussed short presentations on their ideas and applications of technology-enhanced teaching.</p> <p>They could contribute to one or both the workshop sub-themes, namely, Anytime Anywhere practical work and preparing our learners for the 4th industrial revolution.</p> <p>Four prizes were won by the best contributors: 2 x Xinabox and 2 x Takealot vouchers.</p>
<p>6 (i) SAIP-CUT Teacher Workshop 04 to 08 October 2021</p> <p>(ii)SAIP-CUT Online workshop Saturday Sessions 12 February to 12 March 2022 Holiday Session 22-25 March 2022</p>	<p>To improve teachers' skills in teaching complex concepts in physical science in Welkom and Bloemfontein, Free State province.</p> <p>The purpose of the workshop is to improve the competence of Physical Science teachers in the Free State Province. The workshop was open to all interested secondary teachers and subject advisors.</p>	<p>Teachers and student teachers were trained:</p> <p>SAIP-CUT Teacher Workshop</p> <ul style="list-style-type: none"> <li>• Online: 52</li> <li>• Welkom: 10</li> <li>• Bloemfontein: 16</li> <li>• TOTAL: 78</li> <li>• 43 Schools</li> </ul> <p>SAIP-CUT Online workshop</p> <ul style="list-style-type: none"> <li>• 41 &amp; 21 Teachers, respectively</li> <li>• 36 schools</li> <li>• 12 schools</li> </ul>	<p>Teachers are equipped with the knowledge and skills needed to improve physics education.</p> <p>Dr Modise stated that SAIP would contribute to the shortage of physical science teachers and new methodologies and innovative ways of teaching physical science considering COVID-19.</p> <p>Teachers thanked SAIP and CUT for the workshop, which was eye-opening and helped to clear up some misconceptions.</p>
<p>7 Vhembe Teachers workshop - 7 – 9 February 2022.</p>	<p>The SAIP's goal is to improve physics education and teachers' skills in teaching complex concepts in physical science in Vhembe district, Limpopo province.</p>	<p>166 teachers  96 schools</p>	<p>Teachers in the Vhembe district are equipped with the knowledge and skills needed to improve the physics pass rate in the province.</p>
<p>8 South African Physics Olympiad (SAPhO) 2021 (16 August 2021)</p>	<p>SAPhO is an online Olympiad that aims to make STEMI appealing to learners, such that they consider SET as preferable career options; by identifying learners with ability in Physics and then nurturing and monitoring them at university, more students will be interested in taking a career in physics. Press release link: <a href="https://bit.ly/3AD1FnI">https://bit.ly/3AD1FnI</a></p>	<p>40 learners from 20 schools Six provinces</p>	<p>Due to the COVID-19 pandemic, the Olympiad was administered as a hybrid and written partially online.</p>



Activity Name & Dates	Activity Goals	Reach/ Participants	Project Impact Highlights
<p>9 Women in Physics Women's Month - August 2021</p>	<p>Promoting careers in physics during Women's month to attract girls to study physics and women to take careers in physics</p>	<p>18 million people 23 Women Physicists profiled</p>	<p>The campaign also aimed at raising the organisation's profile by telling personal stories of the different women who are members of WiPiSA under the theme 'Wings of Freedom'.</p> <p>All presenters participants received a branded golf shirt, mug, and a mask</p> <p>Scheduled radio interviews were conducted in mainstream media houses in print, social media, TV, and radio</p>
<p>10 Women's month Webinars/ live experiments</p>	<p>The Wings of Freedom theme for women's month was celebrated through a series of webinars and a lab tour That was four webinars and a lab tour.</p> <p>This exercise aimed to create awareness around the great strides women are making in physics while highlighting the need for the development of young, predominantly female scientists in South Africa.</p>	<p>194 researchers, students, and the public</p>	<p>The campaign also aimed at raising the organisation's profile by telling personal stories of the different women who are members of WiPiSA under the theme 'Wings of Freedom'.</p> <p>All presenters participants received a branded golf shirt, mug, and a mask</p> <p>Scheduled radio interviews were conducted in mainstream media houses in print, social media, TV, and radio</p>
<p>11 Teacher Module on Attracting and Retaining girls in physics, Sept 2020, October 2020, May 2021</p>	<p>Equipping high school teachers with teaching techniques to be gender friendly to attract and retain girls in physics</p>	<p>481 teachers trained</p>	<p>Module offered during the SAIP Teacher Development Workshops as a mandatory module</p> <p>The Module was also introduced at the May 2022 trainers' workshop</p>
<p>12 WiPiSA 2022 General Webinars and Fun Night Quiz</p> <p>International Day for Women &amp; Girls in Science (11 February 2022)</p> <p>Work-Life Balance in STEM Careers: Addressing Negative Preconceptions (25 February 2022)</p> <p>WiPiSA Fun Big Quiz Night (22 September 2021)</p>	<p>International Day for Women &amp; Girls in Science by WiPiSA. We conducted an event to honour young aspiring scientists in honour of the 2022 International Day of Women and Girls in Science.</p> <p>WiPiSA and SAIP as we conclude the Month of Love by discussing 'Work-Life Balance in STEM Careers: Addressing Negative Preconceptions.</p> <p>In the fun science-themed evening event, teams were randomly selected on the night</p>	<p>100 participants and 523 Facebook reach</p>	<p>WiPiSA hosted three remarkable high school girls as they shared their experiences in choosing STEM career subjects, their goals, and the challenges they have faced thus far.</p> <p>To provide role models of work-life balance in STEM professions, we have convened panels of dual-career scientists who will describe how they work together with their spouses to build their families while advancing their scientific careers.</p> <p>Our discussion was fruitful and engaged from both the Zoom room and the Facebook page.</p> <p>Zoom platform was used, and three lucky teams walked away with amazing prizes</p>



Activity Name & Dates	Activity Goals	Reach/ Participants	Project Impact Highlights
<p>13 WiPiSA Lunches</p> <ul style="list-style-type: none"> <li>• Univen 21 May 2021</li> <li>• Stellenbosch</li> <li>• UJ 25 October 2021</li> <li>• UKZN/ Wits 19 Nov 2021</li> </ul>	<p>A platform for women to empower each other through difficulties they face in life while encouraging them to pursue physics-related careers.</p>	<p>80 participants from 4 different universities</p>	<p>During the UJ lunch, in between discussions, physics-related and general games were played, and there was intense participation</p> <p>The Univen lunch was attended by female learners, students from Chemistry and Physics departments and university staff who all wished it could be done annually</p> <p>Combining UKZN and Wits lunches allowed for greater networking between universities. Students had access to more information and mentors from their desired field of speciality</p>
<p>14 Empower Her Project</p>	<p>Empowering rural girls to study physics through teaching girls between grades 8 -11 physics experiments, data science, coding, and career guidance.</p>	<p>60 learners from 4 Rural Eastern Cape Schools</p>	<p>Idutywa Town: 2 primary schools</p> <p>Butterworth Town: 2 Primary Schools</p> <p>Total 60 Learners - 30 learners from Idutywa &amp; 28 learners from Butterworth</p>
<p>15 Gender Friendly Physics Curricular Experiments</p>	<p>To stimulate the learner's interest to choose physical science as one of their core subjects and to make the physics curricula more gender friendly by having both female and male physicists perform experiments in a fun and friendly way.</p>	<p>35 Schools in 7 different provinces</p>	<p>Grade 7 – 12 Experiments that are aligned to the DoBE curriculum. These experiments cover almost all terms for each grade as defined in the CAPS curriculum</p> <p>28 Schools from nine provinces were reached. We plan to expand the project to cover more schools</p> <p>This project has a good link with our Essential Skills for Matric resources hence it is expected to have a more significant impact by merging the two projects and having them as part of the teacher development offering</p>
<p>16 South African Physics Olympiad (SAPhO) 2021 Postponed (16 August 2021)</p>	<p>About 40 learners from selected Secondary schools were invited to write the SAPhO 2021. The total number of participants was drastically lower than in previous years due to the Covid-19 pandemic and was administered as a hybrid Olympiad, written partially online.</p>	<p>40 learners from 20 schools Six provinces</p>	<p>SAPhO is an online Olympiad that aims to make STEM appealing to learners, such that they consider SET as preferable career options by identifying learners with ability in Physics and then nurturing and monitoring them at university; more students will be interested in taking a career in physics.</p>



# South African Institute Of Physics Elects Fellows

National boundaries look small when viewed in the context of the universe. In their pursuit of understanding the physical and meta-physical world, physicists form close bonds across the planet. Six such physicists were elected as Fellows of the South African Institute of Physics in 2021.

Many American Physics Society (APS) members build bridges between continents. The SAIP has stated emphatically that it values those bridges by electing new fellows, including Optica and APS members.



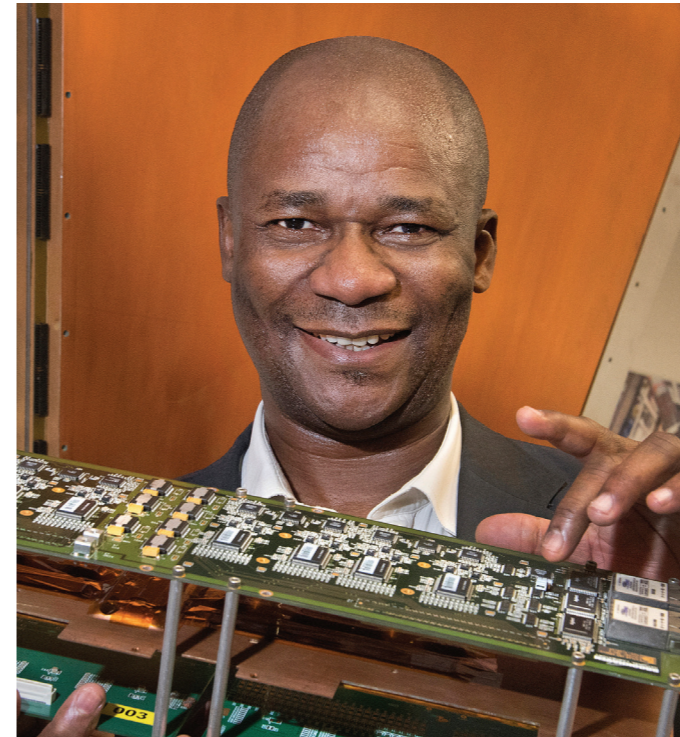
## Prof Andrew Forbes

Is not only a phenomenally successful innovator but also a Distinguished Professor at the University of the Witwatersrand, where he established the Structured Light laboratory in 2015. Prof. Forbes is vigorously active in research and promoting African photonics. He is an initiator of South Africa's Quantum Roadmap and was a founder of the Photonics Initiative of South Africa.

In 2020, he was awarded the SAIP Gold Medal, the highest award for physics

research in South Africa. A year after his PhD from the University of Natal, he became the Technical Director of a small company in the field of lasers and optics. He is one of the few physicists who have guided and grown a company from start-up to becoming the target of a significant buy-out. The chips produced are now used at Lockheed Martin, British Aerospace Systems, NASA, Dassault, and the Italian National Agency ENEA. Prof. Forbes moved to the National Laser Centre, founding and leading the Mathematical Optics group, where the digital laser was demonstrated by replacing laser cavity mirrors with holograms in 2013.

Among his series of world firsts are The demonstration of geometric phase control inside a laser in 2016; Teleportation and entanglement swapping with orbital angular momentum in 2017; The first method of producing a high brightness laser through the breaking of mode degeneracy inside a laser cavity in 2018; The first fractal light from a laser in 2019, and Multi-dimensional entanglement transport down single mode fibres in 2020. He is a Fellow of the Society of Photo-Optical Instrumentation Engineers (SPIE) and the Optical Society of America.



## Dr Kétévi Assamagan

is originally from Togo and is a world-class leader in experimental high-energy physics. He co-founded the African School of Fundamental Physics and Applications. This biennial capacity-building event is bringing Africa into significant participation in global large-scale research infrastructures in the accelerator and particle physics areas.

With his team, he raises the required funding and conducts the planning of the events. A recent project is his leadership initiation of the African Strategy on Fundamental and Applied Physics (ASFAP). Like Snowmass, this is a planning project where the community, as a self-organising complex system, prioritises collaborative initiatives in particle and nuclear physics, with crosslinks and support to associated disciplines and applied fields. An interesting fact is that Dr Assamagan also plays African drums.



## Prof Sylvester James Gates, Jr.

is a renowned expert in supersymmetry, supergravity, and superstring theory. He is the President of the American Physical Society and was awarded the 2011 National Medal of Science.

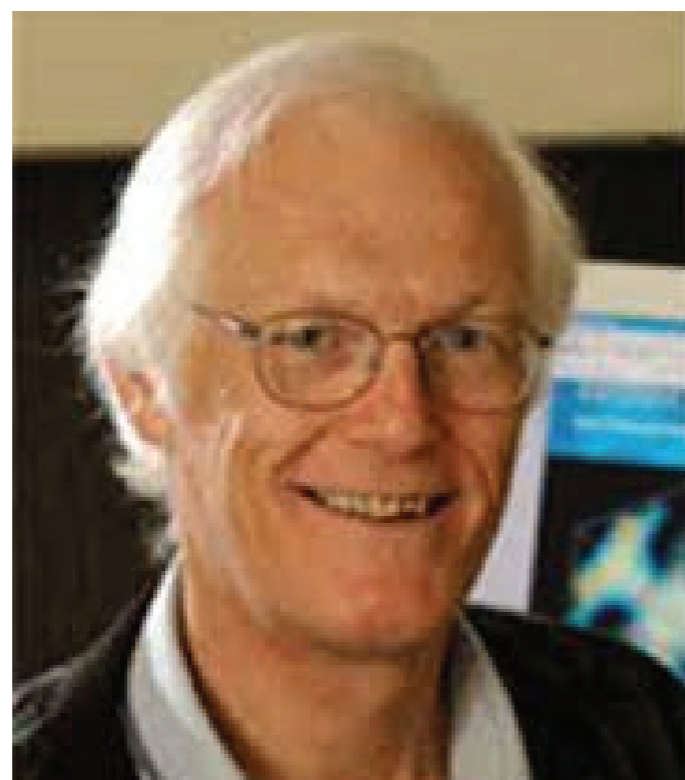
Professor Gates has several interactions with and in South Africa. He referees proposals for the National Research Foundation and has been a Fellow of the Institute for Advanced Study in Stellenbosch, where he spoke at the opening of the "Wine Cellar" Research Building. He has also strung concepts together in several lectures. In his early days in science policy, he was a member of an international panel reviewing physics in South Africa in 2003. The discipline was in crisis at the time, with declining numbers of students and decreasing funding. His empathy and experience were evident in the review "Shaping the Future of Physics." The review is credited with relaunching the community on its current upward trajectory. This is a man who speaks physics to power. He does so with the utmost respect and affection for each human being he encounters.





### Dr James Gubernatis

Worked with an absolute commitment to physics and developing the community of physicists across Africa and South Africa. Through the APS Committee on International Scientific Affairs, CISA, Dr Gubernatis has been a driving force and chief correspondent for the Physics in Africa project and survey, which reaches out to APS, with Institute Of Physics (IOP), European Physics Society (EP, SAIP, and ICTP). Five areas for action emerged from the survey: communication, new physical societies, the general lack of experimental equipment, physics education, and challenges within physics and society. The African Physics Newsletter emerged from Dr Gubernatis's recommendations for improved communication. APN is free and is run by African volunteers, with the unwavering encouragement of Dr Gubernatis. It thrives and is valued across the continent due to the generosity of APS, which provides a mechanism for publication. The African School of Electronic Structure Methods and Applications (ASESMA) is one of the most successful initiatives mounted in and across Africa.



### Prof Richard Martin

Nominated as a SAIP Fellow, a dynamic driver behind ASESMA, which is now in its second decade of operations. Together with Nithaya Chetty and Sandro Scandolo, he participated in the first school in South Africa that led to ASESMA. He has continued as an organiser of each school and the Chair of the International Advisory Panel. ASESMA has built a network of experts in electronic structure calculations, which provides the capability of doing state-of-the-art physics on low budgets with real impact. For example, Africa is rich in natural minerals, and there is a real need for materials development. He is on the African Materials Research Society board and hopes to further materials research through the close coupling of experiments and calculations. Prof Martin is also one of the founders of the USA-Africa Initiative for Electronic Structure (USAfrI) which is sponsored by the APS with a highly significant grant - the only successful application located

outside the USA. The goal is to foster collaborations between the USA and African scientists and students. About 50 groups in the USA have agreed to be potential collaborators. Prof Martin recalls all ASESMA meetings as significant, but he did choose to wrangle calculations while the other lecturers went shark diving in Cape Town.



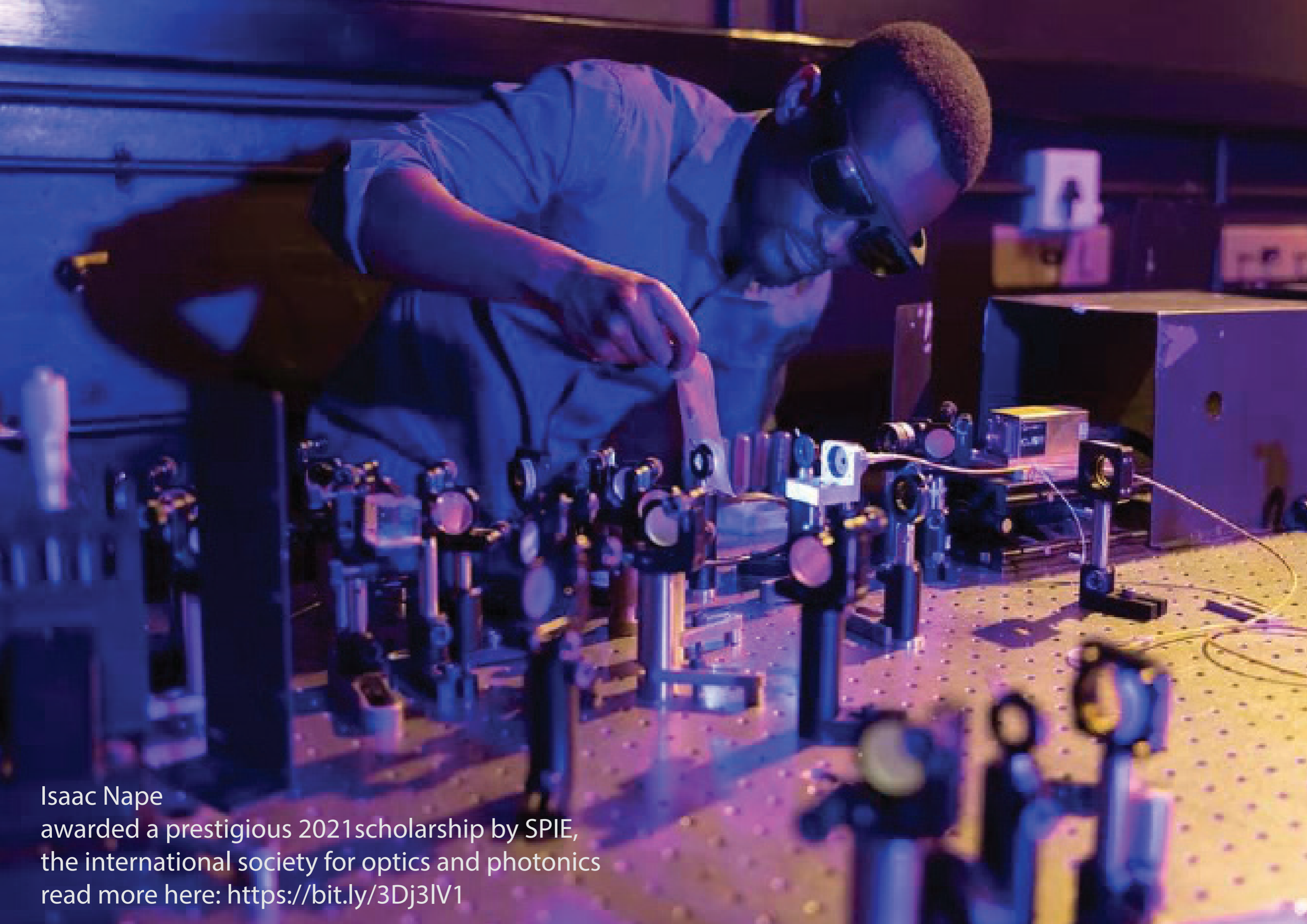
### Prof Sekazi Mtingwa

Has had a lifetime of contributions to the development of physics amongst minorities in the USA and has led significant efforts in strengthening physics in Africa. Prof Mtingwa's introduction to science and technology development in Africa began with Nobel Laureate Abdus Salam's convening a meeting in 1988 at ICTP in Trieste of scientists, mathematicians, and technologists from the USA and Africa. They formed what was later named the Edward Bouchet – Abdus Salam Institute and two significant initiatives sprang from it. One is the effort to provide Africa with a synchrotron: the African Light Source initiative. The second initiative is the African Laser Centre, in collaboration with the National Laser Centre in South Africa - and

a loan program for researchers through which researchers can not only borrow lasers but also arrange vital personnel visits to get the equipment up and running optimally. Prof. Mtingwa co-founded the Light Sources for Africa, the Americas, Asia, and the Middle East Project (LAAAMP) in partnership with over thirty international organisations. He has recently been involved in the founding, in the West African island nation of São Tomé e Príncipe, of the new Union of Physicists from Portuguese-Speaking Countries in Africa. He is Chair of the IUPAP C13 Commission on Physics for Development. The South African Institute of Physics announces new Fellows and prize winners at its annual conference, in a Gala Evening which usually involves not only long speeches but ululation for the winners, loud music, and dancing – physics is, after all, fun. We look forward to seeing the new Fellows showing off their moves.

**Acknowledgements**  
Simon Connell, Nithaya Chetty, Deena Naidoo  
  
Some material from this article has been published in the American Physical Society APS News and in African Physics Newsletter, and is reproduced with APS permission.





Isaac Nape  
awarded a prestigious 2021 scholarship by SPIE,  
the international society for optics and photonics  
read more here: <https://bit.ly/3Dj3IV1>



# SAIP Council and Structures

The SAIP is headed by an elected council; it acts as an executive committee that jointly supervises the activities of the organisation. Its academic affairs are managed through divisions and forums.

## Council

Council Executive	
Prof Makaiko Chithambo (RU)	President
Prof Rudolph Erasmus (Wits)	President-Elect
Prof Regina Maphanga (CSIR)	Secretary
Prof Ernest van Dyk (NMU)	Treasurer
Prof Deena Naidoo (Wits)	Past-President
Ordinary Members of Council	
Prof Alan Cornell (UJ)	Division Rep on Council
Dr EN Maluta (UNIVEN)	Physics Education
Prof M Mathuthu (NWU)	Industrial liaison
Dr R Nmutudi (iThemba LABS)	Fundraising
Dr Z Katamzi-Joseph (SANSA)	Marketing and Outreach
Prof RD Strauss (NWU)	Conferences and Proceedings
Prof E Carleschi (UJ)	Awards and Standard
Ms Anna Chrysostomou (UJ)	Student Rep on Council

## Divisions

Chairperson / Co-chairs	Division / Forum / Working Group
1. Prof Bruce Mellado (Wits)	Nuclear, Particle and Radiation Physics Division
2. Dr Rudolph Nchodu (iThemba)	
3. Prof Rudolph Erasmus (Wits)	Division for Physics of Condensed Matter and Material
4. Dr Sam Ramaila (UJ)	Division for Physics Education
5. Prof Phil Ferrer (Wits)	Applied Physics Forum
6. Dr Zama Katamzi-Joseph (SANSA)	Division for Astrophysics and Space Science
7. Dr Brian Van Soelen (UFS)	
8. Prof Alan Cornell (UJ)	Division for Theoretical and Computational Physics
9. Dr Pieter Neethling (SU)	Photonics Division
10. Dr Rosina Modiba (CSIR)	Forum for Women in Physics
11. Dr Tjaart Kruger (UP)	Biophysics Working Group - (Falls under applied at the moment)

## IUPAP Representation

In addition to participating actively in international physics activities, SAIP represents South Africa in the International Union of Pure and Applied Physics (IUPAP). For the next three years, South Africa will be represented by the following representatives:

Name	IUPAP Portfolio
1. Dr Rudzani Nmutudi (iThembaLABS)	Associate Secretary General
2. Prof Nithaya Chetty (Wits)	Vice President at Large
3. Prof Du Toit Strauss (NWU)	Commission 4 - Astro particle Physics (Member)
4. Prof Christian Muller-Nedbock (SU)	Commission 6 - Biological Physics (Member)
5. Prof Azwinndini Muronga (NMU)	Commission 11 - Particles and Fields (Member)
6. Prof Mmantsae Diale (UP)	Commission 13 - Physics for Development (Secretary)
7. Dr Eric Maluta (UNIVEN)	Commission 14 - Physics Education (member)
8. Prof Markus Bottcher (NWU)	Commission 19 - Astrophysics (member)
9. Prof Regina Maphanga (CSIR)	Commission 20 - Computational Physics (member)
10. Prof Andrew Fobes (Wits)	Commission 17 Lasers and Photonics (member)
11. Prof Mathis Wideking (iThembaLABS)	Commission 12 Nuclear Physics (member)



# OUR TEAM



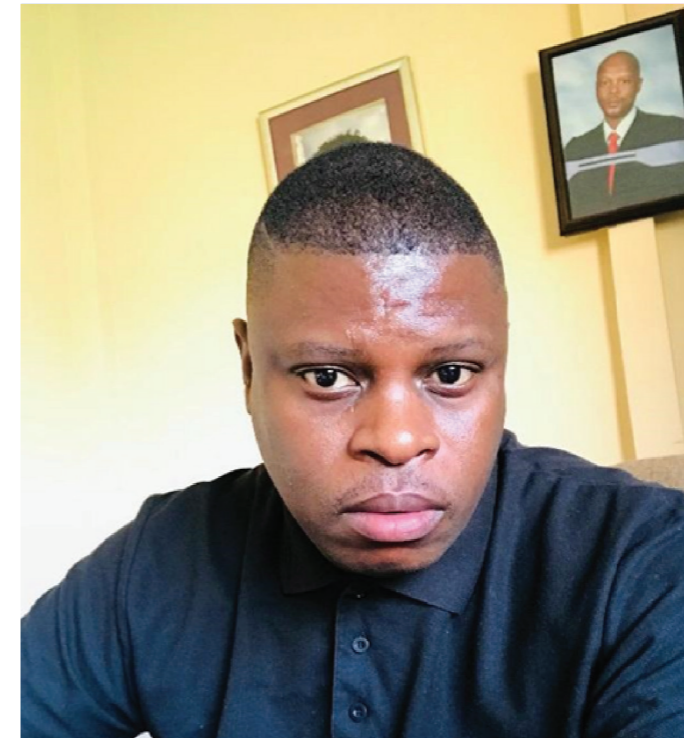
## Brian Masara

SAIP Executive Officer, current and inaugural SAIP CEO, Dr Masara helped establish the SAIP office in 2008. He has over 20 years of experience in managing science and technology-based organisations. Before joining SAIP, he served as the General Manager of SIRMET Founders and Engineers and as the Director of the National Metrology Institute in Zimbabwe. He holds a Doctor of Business Leadership, a Master's in Business Administration, and an MSc and BSc (Hons) in Applied Physics. He combines his scientific and analytical background with management skills in the leadership of science and technology organisations. His interests include technological entrepreneurship, innovation management, technology foresight, and strategic management.



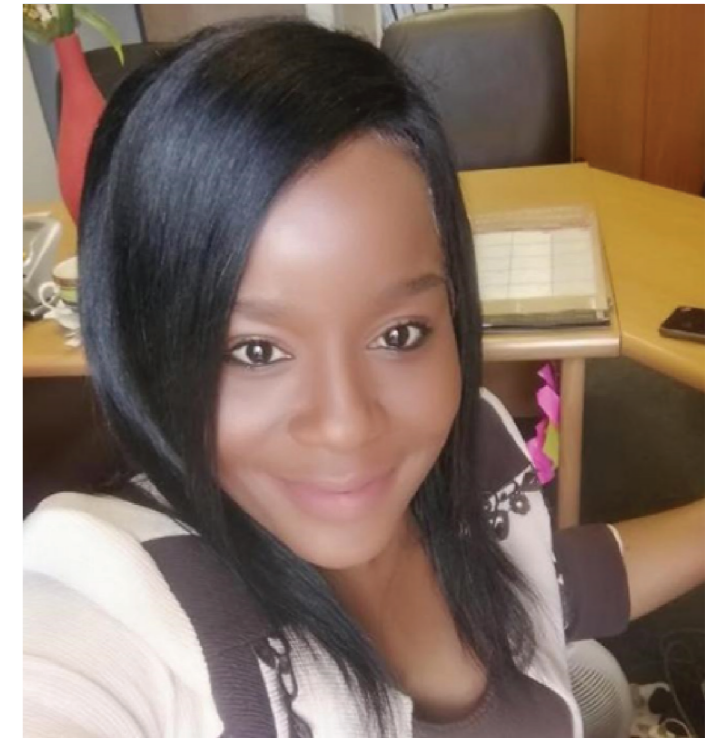
## Ndanganeni Salphinah Mahani

Projects Officer for SAIP, Mahani has over nine years of project management experience, science engagement, and promotion, and has managed, coordinated, and executed NSW and outreach projects funded by DSI and NRF/SAASTA. She has excellent events management skills, such as hosting workshops and regional and international conferences. She is a beneficiary of the Department of Science and Technology NRF/SAASTA National Youth Service Programme, hosted by CSIR-National Laser Centre, where she got exposed to laser science. She joined SAIP in 2015 and holds a Mining and Environmental Geology degree from the University of Venda and a Project Management certification from CSIR CILLA.



## Tebogo Mokhine

Tebogo Mokhine is the current IT Officer of the South African Institute of Physics. Mokhine has over 14 years of experience in the field of IT. He has worked as an IT consultant at Accenture, where he was exposed to different projects and roles, which include SARS e-filing - Adobe Developer, Vodacom Talliman - Java Developer, Eskom - BPEL Integration developer, Anglo Gold Ashanti - Java Developer, and SITA IFMS - Java Developer. He holds a National Diploma in Technical Applications and an Oracle Certified Java Associate Java Certificate. His interests are System development and DevOps Development.



## Queen Thabethe

Secretary and Administrator, has over five years of experience in administrative, bookkeeping, Sage Accounts, clerical support, switchboard operating, data capturing, and sales retail management. She is proficient in MS packages and SA-SAMS. She has worked for different academic institutions, including CTU Training Solutions and the Varsity Institute of Science and Technology. She has a diploma in public management from the Varsity Institute of Science and Technology. Thabethe is enthusiastic about increasing public awareness of new laws.



# ANNUAL FINANCIAL STATEMENTS FOR THE YEAR ENDED 31 MARCH 2022

## Treasurer's Responsibilities and Approval

The treasurer is required by the Companies Act of South Africa, to maintain adequate accounting records and are responsible for the content and integrity of the annual financial statements and related financial information included in this report. It is their responsibility to ensure that the annual financial statements fairly present the state of affairs of the institute as at the end of the financial year and the results of its operations and cash flows for the period then ended, in conformity with the International Financial Reporting Standard for Small and Medium-sized Entities. The external auditors are engaged to express an independent opinion on the annual financial statements.

The annual financial statements are prepared in accordance with the International Financial Reporting Standard for Small and Medium-sized Entities and are based upon appropriate accounting policies consistently applied and supported by reasonable and prudent judgements and estimates.

The treasurer acknowledges that he is ultimately responsible for the system of internal financial control established by the institute and place considerable importance on maintaining a strong control environment. To enable the treasurer to meet these responsibilities, the treasurer sets standards for internal control aimed at reducing the risk of error or loss in a cost effective manner. The standards include the proper delegation of responsibilities within a clearly defined framework, effective accounting procedures and adequate segregation of duties to ensure an acceptable level of risk. These controls are monitored throughout the institute and all employees are required to maintain the highest ethical standards in ensuring the institute's business is conducted in a manner that in all reasonable circumstances is above reproach. The focus of risk management in the institute is on identifying, assessing, managing and monitoring all known forms of risk across the institute. While operating risk cannot be fully eliminated, the institute endeavours to minimise it by ensuring that appropriate infrastructure, controls, systems and ethical behaviour are applied and managed within predetermined procedures and constraints.

The treasurer is of the opinion, based on the information and explanations given by management, that the system of internal control provides reasonable assurance that the financial records may be relied on for the preparation of the annual financial statements. However, any system of internal financial control can provide only reasonable, and not absolute, assurance against material misstatement or loss.


The treasurer has reviewed the institute's cash flow forecast for the year to 31 March 2023 and, in the light of this review and the current financial position, he is satisfied that the institute has or has access to adequate resources to continue in operational existence for the foreseeable future.

The external auditors are responsible for independently auditing and reporting on the institute's annual financial statements. The annual financial statements have been examined by the institute's external auditors and their report is presented on page 8 - 7.

The annual financial statements set out on pages 8 to 12, which have been prepared on the going concern basis, were approved by the treasurer on 30 June 2022 and were signed on its behalf by:



**President: SAIP**



**Honorary Treasurer: SAIP**

## Treasurer's Report

The treasurer has pleasure in submitting his report on the annual financial statements of South African Institute of Physics for the year ended 31 March 2022.

### 1. Incorporation

The institute was founded on 25 February 2011 and obtained its certificate to commence business on the same day.

### 2. Nature of business

South African Institute of Physics was incorporated in South Africa and its main objective is to promote and recognise excellence in physics in all its forms, to encourage greater collaboration amongst physicists and to enhance public awareness of issues relating to physics and creating a positive image of physics in South Africa.

There have been no material changes to the nature of the institute's business from the prior year.

### 3. Review of financial results and activities

The annual financial statements have been prepared in accordance with International Financial Reporting Standard for Small and Medium-sized Entities and the requirements of the Companies Act of South Africa. The accounting policies have been applied consistently compared to the prior year.

Full details of the financial position, results of operations and cash flows of the institute are set out in these annual financial statements.

### 4. Events after the reporting period

The treasurer is not aware of any material event which occurred after the reporting date and up to the date of this report.

### 5. Going concern

The treasurer believes that the institute has adequate financial resources to continue in operation for the foreseeable future and accordingly the annual financial statements have been prepared on a going concern basis. The treasurer has satisfied himself that the institute is in a sound financial position and that it has access to sufficient borrowing facilities to meet its foreseeable cash requirements. The treasurer is not aware of any new material changes that may adversely impact the institute. The treasurer is also not aware of any material non-compliance with statutory or regulatory requirements or of any pending changes to legislation which may affect the institute.

### 6. Auditors

Mazars continued in office as auditors for the institute for 2022.



## South African Institute of Physics Independent Auditor's Report

31 March 2022

### Report on the Audit of the Financial Statements

#### Opinion

We have audited the financial statements of South African Institute of Physics set out on pages 8 to 12, which comprise the statement of financial position as at 31 March 2022, and the statement of profit or loss and other comprehensive income and statement of changes in equity for the year then ended, and notes to the financial statements, including a summary of significant accounting policies.

In our opinion, the financial statements present fairly, in all material respects, the financial position of South African Institute of Physics as at 31 March 2022, and its financial performance and cash flows for the year then ended in accordance with the International Financial Reporting Standard for Small and Medium-sized Entities and the requirements of the Companies Act of South Africa.

#### Basis for Opinion

We conducted our audit in accordance with International Standards on Auditing (ISAs). Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are independent of the company in accordance with the Independent Regulatory Board for Auditors' Code of Professional Conduct for Registered Auditors (IRBA Code) and other independence requirements applicable to performing audits of financial statements in South Africa. We have fulfilled our other ethical responsibilities in accordance with the IRBA Code and in accordance with other ethical requirements applicable to performing audits in South Africa. The IRBA Code is consistent with the corresponding sections of the International Ethics Standards Board for Accountants' International Code of Ethics for Professional Accountants (including International Independence Standards). We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

#### Other Information

The members are responsible for the other information. The other information comprises the information included in the document titled "South African Institute of Physics Separate Financial Statements for the year ended 31 March 2022" and the document titled Treasurer's Report, as required by the Companies Act of South Africa.

Our opinion on the financial statements does not cover the other information and we do not express an audit opinion or any form of assurance conclusion thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the audit, or otherwise appears to be materially misstated. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

#### Responsibilities of the Members for the Financial Statements

The members are responsible for the preparation and fair presentation of the financial statements in accordance with International Financial Reporting Standard for Small and Medium-sized Entities and the requirements of the Companies Act of South Africa, and for such internal control as the members determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the members are responsible for assessing the company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the members either intend to liquidate the company or to cease operations, or have no realistic alternative but to do so.

#### Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements. A further description of our responsibilities for the audit of the financial statements is included in the appendix to this auditor's report. This description, which is located at page 7, forms part of our auditor's report.



**Mazars Partner: JJ Eloff**  
**Registered Auditor**  
**Date: 12 July 2022**  
**Pretoria**



# Auditor's Responsibilities for the Audit of the Financial Statements

## Appendix

As part of an audit in accordance with ISAs, we exercise professional judgement and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the company's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the members.
- Conclude on the appropriateness of the members' use of the going concern basis of accounting and based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the company to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with the members regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

### Statement of Financial Position as at 31 March 2022

Figures in Rand	2022	2021
<b>Assets</b>	<b>Content</b>	<b>Content</b>
<b>Current Assets</b>		
Trade and other receivables	704,662	956,489
Cash and cash equivalents	6,525,998	6,608,071
	7,230,660	7,564,560
<b>Total Assets</b>	7,230,660	7,564,560
Equity and Liabilities		
Equity		
Reserves	3,555,624	3,828,850
Retained income	3,632,196	3,569,589
	7,187,820	7,398,439
<b>Liabilities</b>		
Current Liabilities		
Trade and other payables	42,840	166,121
<b>Total Equity and Liabilities</b>	7,230,660	7,564,560

### Statement of Comprehensive Income

Figures in Rand	2022	2021
<b>Membership fees</b>	<b>559,327</b>	<b>448,273</b>
<b>Other Income</b>		
Sponsorship	15,000	
<b>Operating Expensis</b>		
Affilian fees		1,140
Auditors remuneration	43,803	
Bad debt	442,990	6,551
Bank Charges	6,908	5,776
Honoraria	37,954	36,320
Othe Expenses	126,927	247,133
Physics olympiad prizes	608	
Travel - local	85,200	10,000
	3,221	
	747,611	306,920
<b>Operating (loss) profit</b>	(173,284)	141,353
Investment income	235,891	168,913
		310,266
<b>Profit for the year</b>	62,607	
Other comprehensive income		310,266
<b>Total comprehensive income for he year</b>	62,607	

### Statement of Changes in Equity

Figures in Rand	Other NDR	Retained income	Total equity
<b>Balance at 01 April 2020</b>	<b>3,169,761</b>	<b>3,259,323</b>	<b>6,429,084</b>
<b>Profit for the year</b>		310,266	310,266
<b>Other comprehensive income</b>			
<b>Total comprehensive income for the year</b>		<b>310,266</b>	<b>310,266</b>
<b>Transfer between reserves</b>	659,089	-	659,089
<b>Total changes</b>	<b>659,089</b>		659,089
<b>Balance at 01 April 2021</b>	<b>3,828,850</b>	<b>3,569,589</b>	<b>7,398,439</b>
<b>Profit for the year</b>		62,607	62,607
<b>Other comprehensive income</b>			
<b>Total comprehensive income for the yearT-</b>		<b>62,607</b>	<b>62,607</b>
<b>ransfer between reserves</b>	(273,226)		<b>(273,226)</b>
<b>Total changes</b>	<b>(273,226)</b>		(273,226)
<b>Balance at 31 March 2022</b>	<b>3,555,624</b>	<b>3,632,196</b>	<b>7,187,820</b>



## Basis of preparation and summary of significant accounting policies

The annual financial statements have been prepared on a going concern basis in accordance with the International Financial Reporting Standard for Small and Medium-sized Entities, and the Companies Act of South Africa. The annual financial statements have been prepared on the historical cost basis, and incorporate the principal accounting policies set out below. They are presented in South African Rands.

These accounting policies are consistent with the previous period.

## Financial instruments

### Financial instruments at cost

Equity instruments that are not publicly traded and whose fair value cannot otherwise be measured reliably without undue cost or effort are measured at cost less impairment.

### Derecognition

Financial assets are derecognised when the rights to receive cash flows from the investments have expired or have been transferred and the entity has transferred substantially all risks and rewards of ownership.

Financial liabilities are derecognised when they are extinguished, i.e. the contract is discharged, cancelled or expires.

## Tax

### Tax expenses

The institute is exempt from taxation.

### Derecognition

Revenue is measured at the fair value of the consideration received or receivable and represents the amounts receivable for goods and services provided in the normal course of business, excluding sales taxes and discounts.

Interest is recognised, in profit or loss, using the effective interest rate method.

## Notes to the Annual Financial Statements

Figures in Rand	2022	2021
<b>2. Trade and other receivables</b>		
Trade receivables	704,662	956,489
<b>3. Cash and cash equivalents</b>		
Cash and cash equivalents consist of:		
Cash on hand	584	732
Bank balances	1,251,738	194,439
Short-term deposits	5,273,676	6,608,071
	<b>6,525,998</b>	
<b>4. Trade and other payables</b>		
Trade payables		27,029
VAT	20,687	116,939
Other payables	22,153	22,153
	<b>42,840</b>	<b>166,121</b>
<b>5. Revenue</b>		
Membership fees	559,327	448,273
<b>6. Other income</b>		
Sponsorship	15,000	
<b>7. Auditor's remuneration</b>		
Fees	43,803	
<b>8. Investment revenue</b>		
<b>Interest revenue</b>		
<b>Bank</b>	235,891	168,913
<b>9. Taxation Non provision of tax</b>		
No provision has been made for 2022 tax as the institute is exempt from tax. (PBO exemption number <b>930026892</b> )		
<b>10. Cash used in operations</b>		
Profit before taxation	62,607	310,266
<b>Adjustments for:</b>		
<b>Interest</b> received	(235,891)	(168,913)
<b>Changes in working capital:</b>		
Trade and other receivables	251,827	(266,607)
Trade and other payables	(123,281)	71,409
	<b>(44,738)</b>	<b>(53,845)</b>



## Trust Funds

Figures in Rand	2022	2021
<b>1. African Light Source 2015 Conference</b>		
Opening balance	890	(99,110)
Contributions		100,000
	<b>890</b>	<b>890</b>
<b>2. African School of Physics</b>		
Opening balance	1,706,077	1,706,077
Contribution		
	<b>1,706,077</b>	<b>1,706,077</b>
<b>3. SAIP 2019</b>		
Opening balance	(9,574)	(10,376)
Contributions		51,802
<b>Costs</b>		(51,000)
	<b>(9,574)</b>	<b>(9,574)</b>
<b>4. Biophysics project</b>		
Opening balance	38,523	67,793
Costs	(26,764)	(29,270)
	<b>11,759</b>	<b>38,523</b>
<b>5. ICPE 2018</b>		
Opening balance		22,671
Contributions		40,986
Costs		<b>(63,657)</b>
<b>6. DPCMM</b>		
Opening balance	<b>50,854</b>	<b>50,854</b>
<b>7. Entrepreneurs Workshop</b>		
Opening balance	99,030	99,030
	<b>99,030</b>	<b>99,030</b>
<b>8. Marketing &amp; Outreach</b>		
Opening balance	20,315	45,980
Costs		(25,665)
	<b>20,315</b>	<b>20,315</b>
<b>9. SACPM</b>		
Opening balance	384,019	384,019
Costs	(20,001)	
	<b>364,018</b>	<b>384,019</b>
<b>10. SAIP 2021</b>		
Contribution	359,952	
Costs	(190,171)	
	<b>169,781</b>	
<b>11. Physics Graduates Database</b>		
Opening balance		21,888
Costs	21,888	
	<b>(21,888)</b>	<b>21,888</b>
<b>12. SAIP 2018</b>		
<b>Opening balance</b>		
<b>Costs</b>		<b>147,862</b>
		<b>(147,862)</b>
<b>13. Endowment Seed Fund</b>		
Opening balance	224,109	
Contributions	-	224,109
Costs	(224,109)	
		<b>224,109</b>

## Notes to the Annual Financial Statements

Figures in Rand	2022	2021
<b>14. National Science Week</b>		
Opening balance	9,698	9,698
Contributions	259,650	
Costs	(258,339)	
	<b>11,009</b>	<b>9,698</b>
<b>15. SAIP Office DST Grant</b>		
Opening balance	428,897	77,985
Contributions	1,669,538	1,669,538
Costs	(2,605,371)	(1,318,475)
	<b>(506,936)</b>	<b>428,897</b>
<b>16. SAPHO</b>		
Opening balance	428,897	77,985
Contributions	1,669,538	1,669,387
Costs	(2,605,371)	(1,318,475)
	<b>(506,936)</b>	<b>428,897</b>
<b>17. SAPHO</b>		
Opening balance	17,927	17,927
Contributions	44,858	
Costs	(43,536)	
	<b>19,249</b>	<b>17,927</b>
<b>18. Student Chapter Project</b>		
Opening balance	9,123	9,123
	<b>9,123</b>	<b>9,123</b>
<b>19. SAIP Office Project</b>		
Opening balance	780,251	339,199
Contribution	312,121	458,268
Cost		(17,216)
	<b>1,092,372</b>	<b>780,251</b>
<b>20. Undergraduate Degree Project</b>		
Opening balance	134,505	134,505
Contributions	(14,966)	78,083
Costs	350,000	
	<b>42,154</b>	<b>(14,966)</b>
<b>22. Teacher Development Project</b>		
Opening balance	(199,533)	(20,184)
Contributions	1,415,360	203,603
Costs	(1,216,099)	(382,952)
	<b>(272)</b>	<b>(199,533)</b>
<b>23. Radiation</b>		
Opening balance	15,000	15,000
Contributions	8,696	
Costs	(23,696)	
		<b>15,000</b>
<b>22. COSFLOW 2020</b>		
Opening balance		55,981
Contributions		28,043
Costs		(84,024)





# SA INSTITUTE OF PHYSICS OFFICE *Services*

In line with our mission: **"To be the voice of physics in South Africa"**, the SAIP Office offers a wide range of services addressing many levels of involvement with the physics community and related stakeholders.

## PRIVATE AND PUBLIC PARTNERSHIP PROJECTS

The SAIP Office plays a leadership role in interacting and communication with government, private sector and NGOs on the role of physics in supporting and underpinning science, technology and sustainable socio-economic development. We respond timeously to challenges facing the physics community by initiating projects that address observed challenges with these stakeholders.

### SAIP - Government Partnerships

We have partnered with government in implementing their grand strategies and implementing policy on science and technology through various projects. Some of these projects include:

- SA Physics Graduates Database
- Review of Physics Training in SA
- Women into Physics in SA - WiPiSA
- SA Biophysics Initiative
- Outreach and Public Understanding of Physics

### SAIP - Private Sector Partnerships

#### Advice on employing physicists

Many employers are attracted to physics graduates because they have a good mix of technical skills together with research-related skills. The SAIP office provides help to private sector by:

- maintaining a database of physics graduates available for employment
- maintaining a database of consultants available for e.g. energy management, vehicle accidents analysis
- providing examples of jobs that physicists do
- providing general guidelines on promotion criteria and performance evaluation of physicists / research scientists

#### Joint science awareness campaigns

Attracting the youth into science is one principal concern of corporate social responsibility. SAIP has perfected its skills and materials for science awareness:

- Physics Olympiad,
- attracting youth and girls into science,
- school outreaches focusing on science careers,
- industry and laboratory visits.

#### Physics industry support

Support for physics in industry through

- Links with research and academic community
- Innovation to commercialisation management
- Business opportunities presented by mature R&D technologies
- Start-up support
- Annual "Physics in Industry Day"

### SAIP -NGO Sector Partnerships

The SAIP Office also partners with the science donor community in implementing projects of mutual benefit. Examples of projects jointly done with international donor community include

- Entrepreneurship Training for Physicists from Developing Countries
- African Physical Societies Presidents Forum meeting
- Promotion of girls and women into physics

## MEMBERSHIP SERVICES

- Distribution of important information such as jobs, bursaries, conferences and workshops
- Writing letters of recommendation for general employment reference in cases where professional affiliation is requirement
- Writing support letters for professional work permits in cases where professional affiliation is a requirement
- Advice of career progression as a physicists e.g. duties, job description, notches etc.
- Many other advantages as described in the *SAIP Membership Brochure*

## SCIENTIFIC CONFERENCES, SCHOOLS AND WORKSHOPS

- Event Coordination and planning
- Creating conference website
- Conference management system to handle registrations, invoicing, abstract submission abstracts review
- Helping with fundraising for conference
- Marketing and publicity of events to ensure full subscription
- Handling logistics travel arrangements, venue booking issues, VISA letters, Delegate liaison
- Handling awarding of conference sponsorship receiving sponsorship applications short listing of qualifying applicants
- Social functions arrangements including inviting influential social function speakers and guests
- Financial management for conference

## PROFESSIONAL DEVELOPMENT

We are introducing continuous professional development courses:

- New Lecturer Teaching & Learning Skills Training
- Management of research and development
- Entrepreneurship & patenting
- Laboratory quality management

## PHYSICS GIFTS SHOP

Organisers for physics related conferences, winter schools, summer school, and workshops no longer need to worry about procurement of affordable conference materials. The SAIP office has set up a Physics Gifts Shop for the following:

- conference bags,
- branded t-shirts, golf shirts and track-suits
- conference stationery
- cool physics gifts

## PRIME ADVERTISING SPACE

If you want to target the science community, SAIP offers advertising space and contact to physics and science community through the following media

- SAIP Website
- Physics Comment Magazine
- Conferences and Workshop materials e.g. conference proceedings, conference books, exhibition stands
- Direct mail database to individuals and institutions



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