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Physics Comment

A Southern African Physics Magazine



SAIP 2020
South African Institute
of Physics Conference



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A Quarterly Newsletter

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Editors: Dr Rudolph Erasmus

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With best wishes for the festive season from the Editorial Team.

Dr Rudolph Erasmus

Physics Comment is a magazine published by the South African Institute of Physics (SAIP) and appears quarterly. The vision of the SAIP is to be the voice of Physics in South Africa.



SAIP Council: Prof. D. Naidoo (Wits) President, Prof. M. Chithambo (RU) President-Elect, Prof. R. Maphanga (CSIR) Secretary, Prof. E. van Dyk (NMU) Treasurer, Prof. P. A. Woudt (UCT) Past-President, Dr. R. Nemetudi (iThemba LABS) Fundraising, Dr. J.B. Habarulema (SANSA) Conferences, Prof. I. Usman (Wits) Industrial Liaison, Dr Z. Katamzi-Joseph (SANSA) Marketing & Outreach, Dr R. Erasmus (Wits) Awards & Standards, Dr R. Harris (UFS) (Education), Dr Eric Maluta (UNIVEN) (Education).



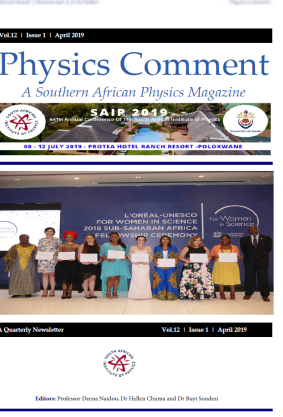
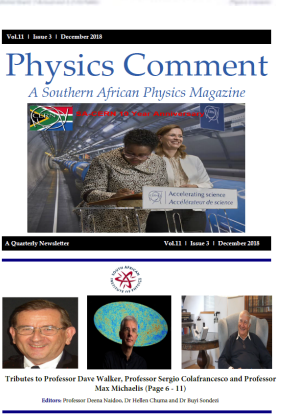
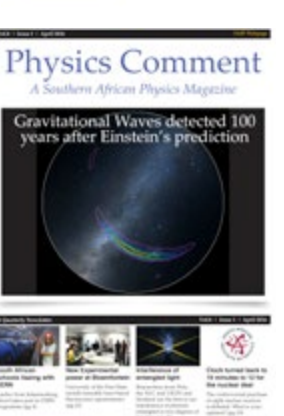
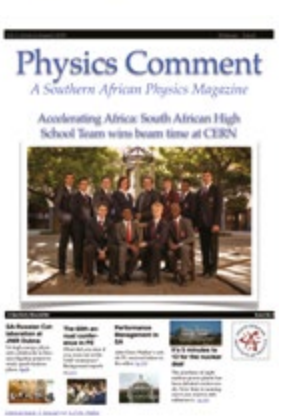
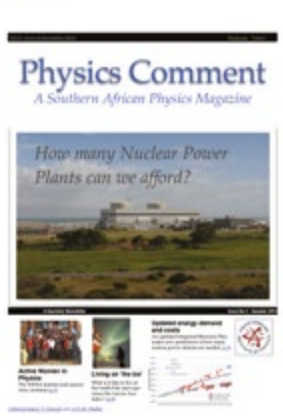
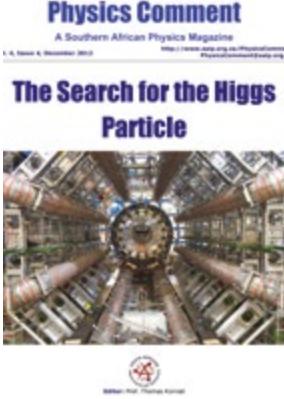
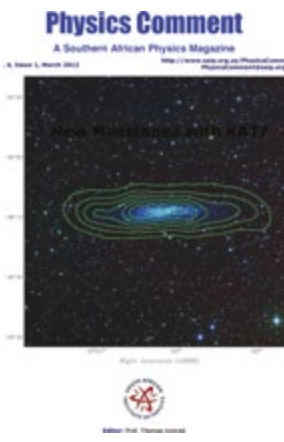
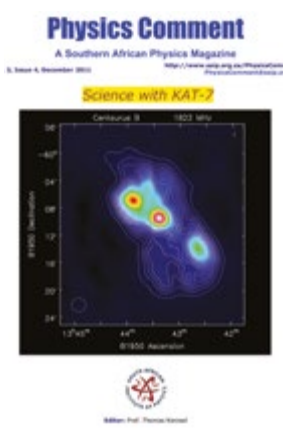
New SAIP Council at Council meeting of 8 July 2019 (not all members in photograph)

With contributions from the SAIP Office:

Ndanganeni Mahani (Articles)

Tebogo Mokhine (Layout)

Brian Masara (Articles)



Physics Comment
A Southern African Physics Magazine
2011 - 2019

President's Corner: Message from the past President Professor Patrick Woudt on behalf of the Council of SAIP

The new council of the SAIP has started its work in Polokwane at the 64th annual conference of the SAIP. For my part this is a time to look back on the past two years, to reflect on the science highlights of the South African physics community, the annual SAIP conferences, the projects of the SAIP, and, last but not least, the people of the SAIP.

From the president's corner I have often highlighted the major science stories from our community. A particular highlight since the last edition of Physics Comment was the first ever image of a black hole - the supermassive black hole in the centre of the massive galaxy M87.

The release of the first ever image of a black hole was streamed live across the world and the iconic image featured on the front pages of all the world's major news papers. It is particularly good to see South African researchers featuring in this collaboration.

Associate Professor Roger Deane (University of Pretoria) and his team are members of this breakthrough science project. These kinds of flagship science projects, much like CERN and SKA, are truly global collaborative efforts in which South Africa proudly takes its rightful place.

From all of us at the SAIP, I would like to extend my heartfelt congratulations to Associate Professor Deane and his colleagues for this wonderful achievement.

The 64th annual conference in Polokwane, hosted by the Department of Physics of the University of Venda was a great success.

I thank Dr Eric Maluta and his entire team of the local organising committee for creating such a wonderful and welcoming atmosphere throughout the week. The word 'wonderful stars' was used many times at the conference, starting with the plenary of the 2018 SAIP de Beers Gold Medal winner Prof Patricia Whitelock, and repeated throughout the week to highlight the quality of the plenary talks and the student presentations. The local organisers can be proud of their achievements in delivering a top conference. The bar is placed very high for the host of the 65th annual conference of the SAIP, North West University. A huge thanks to the University of Venda.

The SAIP is a voluntary professional body and is the Voice of Physics in South Africa. We are a network of people across the country and connected to relevant initiatives in physics throughout the African continent. A flagship project of the SAIP is the physics teacher development program.

Over the last year this successful program has been extended to many different parts of the country through our hub and spokes model. In setting up the Physics for Development Foundation trust, the SAIP has been working hard to ensure the sustainability of this, and other important projects, of the institute.

As a voluntary professional body, the SAIP has been working with the colleagues from the DST to ensure that the Voice of Physics is heard when considering policy decisions. We are tremendously grateful to the multi-year grant from the DST to support the running of the SAIP office.

Finally, it is the people of the SAIP that make the institute what it is today, a vibrant network of people, a vibrant network of volunteers. I want to thank all of the volunteers of the SAIP who dedicate their time and energy to the important projects of the SAIP. Particularly, I want to thank the people of the SAIP office, under the incredible leadership of Brian Masara. I want to thank the outgoing council for their support, friendship and collegiality over the past two years, guiding the SAIP from strength to strength.

More than anything, this is a time to look forward. This issue of Physics Comments highlights the impact that MeerKAT is making in the professional literature, following the detection of the newly discovered large-scale bubbles in the Galactic centre observed by MeerKAT, reported in Nature. Undoubtedly this will be the start of many more ground breaking MeerKAT discoveries in years to come.

This is an exciting time for physics in South Africa. For my part, it has been a great journey these past two years as President of the SAIP and I have been privileged to walk this journey with you. I wish the new SAIP council, under the excellent leadership of Prof Deena Naidoo, all the best.

Patrick Woudt
Past president, SAIP

Univen hosts the 64th South African Institute of Physics Conference

Monday, 08 July 2019 marked the official opening of the 64th South African Institute of Physics (SAIP) Conference. The 64th SAIP Conference was hosted by the University of Venda (Univen) at The Ranch Hotel, a few kilometers outside Polokwane, from 8 to 12 July 2019.

The Conference consisted of 360 presentations, 68 posters, seven exhibitors and sponsors. All South African universities including two Universities of Technologies (TUT and CPUT) participated in the conference. African universities from Tanzania and Botswana were among participating universities. Internationally, universities from United Kingdom and USA also participated.

Participating research institutions included CSIR, iThemba LABS, Square Kilometer Array (SKA) and South African National Space Agency (SANSA). Government institutions included National Research Foundation (NRF), Department of Science and Technology (DST) and Limpopo Tourism Agency (LTA).

Citation SAIP Gold Medal 2018

The SAIP Gold award is made for outstanding achievements in any of the following facets of any branch of Physics: research, education, technology and industrial development. As the highest standards are applied, the award is intended to be the greatest distinction that is conferred in South Africa for achievements in Physics.



Prof Patricia Ann Whitelock

The 2018 SAIP Gold Medal is awarded to Professor Patricia Ann Whitelock for her outstanding research career in astronomy and astrophysics, and for her distinguished and extensive contributions to leadership, education and human capacity development of the Physics and Astronomy community. Prof Whitelock is an NRF A-rated researcher who has authored and co-authored 190 peer-reviewed journal articles over her career. Her research is focused on our understanding of the late stages of stellar evolution and mass-loss of evolved stars, the structure of the Milky Way galaxy, and the stellar content of the local group galaxies. Her scientific work has been cited over 8000 times. Prof Whitelock's association with the South African Institute of Physics is long and distinguished. She has been a member since 1985, she chaired the Astrophysics group between 1990 and 1997, she served on council from 1997 to 2005, as president-elect from 1999 to 2001, and as president from 2001 to 2003. Under her leadership, the SAIP started the "Future of Physics" initiative in 2001. She was elected an honorary member of the SAIP in 2008.

During Prof Whitelock's career she has held various important positions. She served as deputy director, acting director, and director of the South African National Facility for Optical Astronomy, the South African Astronomical Observatory. She also served on the NRF executive from 1998 to 2003. She currently is the chair of the Scientific Council of the Strasbourg Astronomical Data Centre and is a member of two executive committee working groups of the International Astronomical Union: 1) Global Coordination of Ground and Space Astrophysics, and 2) Women in Astronomy.

Prof Whitelock's contribution to the development of the astronomical community in South Africa are extensive. She helped to establish the National Astrophysics and Space Science Program where she served as the first chair of its steering committee between 2002 and 2013. She was also one of the key drivers behind the successful bid by South Africa to host the international Office of Astronomy for Development of the IAU. She served on its founding steering committee and currently serves on the steering committee of Southern African Regional Office of Astronomy for Development.

By awarding the 2018 SAIP Gold Medal to Prof Whitelock, the SAIP bestows onto her the greatest distinction that is conferred in South Africa for achievements in Physics.

Physics Bowl at SAIP2019

The theme for the 4th Physics Bowl held at SAIP2019 was Avengers Endgame. Nine teams from six universities (NWU, UCT, UL, Univen, UNIZULU and Wits) competed. Moving with 4IR (4th Industrial Revolution), instead of traditional buzzers, Kahoot software was used instead. It was pre-downloaded on participants' smartphones, tablets and laptops.

Congratulations to the winners, 1st place went to UCT, with Univen2 coming 2nd and NWU1 in third place. There was also a prize for best dressed participant. Many thanks to all the participants and the sponsor for prizes, Bluestallion Wolfram Mathematica.



Overall winner, UCT and 2nd prize winner (Univen2)



3rd place winners, NWU1 and the UL team participants

Physics in Industry Day at SAIP2019

Following on the successful launch of the Physics in Industry Day on Thursday 27 June 2018 during the SAIP2018 Conference that was held at the University of Free State (Bloemfontein), the SAIP organised another such event at the Protea Ranch Hotel Polokwane on 12 July 2019. It was presented as a parallel session in the Applied Physics track and was graced with many enthusiastic researcher and postgraduate student attendees.

The goals of the Physics in Industry Day are:

- 1) To inculcate an entrepreneurship culture among physicists
- 2) To develop skills in innovation and commercialization of research among physicists - as you are aware most of the physics of today is the technology of tomorrow
- 3) To bridge the innovation Chasm - most research ideas are sitting on shelves and not getting to the market
- 4) To share experiences with those who have done it and created successful businesses from their research
- 5) To create links between industry and physics; as you are, aware South African industry does not fully understand the role of physics in technology development unlike chemistry
- 6) To provide a platform where industry can possibly present research related problems they have and physicists can identify opportunities to work with industry to solve those problems
- 7) To present a platform where physics community can present their research that's ready for commercialization or can solve various problems and see if the industry can utilize it.

Key areas suggested by planning committee

Key Area	Number of speakers
i) Careers prospects in physics	1
ii) Entrepreneurship	2
iii) Academic-industry collaborations (shared research projects)	2

The Programme

Time	Suggested Topic / Area	Proposed Presenter
10:00 – 10:40	Intellectual Property, Innovation Management and the Role of NIMPO in Innovation Support in South Africa	NIMPO Rep Ms Lungelwa Kula
10:40 – 11:20	PV Insight	Prof Ernest van Dyk
11:20 – 12:00	Experiences and Lessons Learned on Careers in Industry, Innovation and Commercialisation of Physics Research	Mikhail Sakharov
12:00 – 12:40	Industry-Academia Collaborations – Case Study of Diamond Sorting	Prof Simon Connell /Dr Cook
12:40 – 13:00	Discussion of Improving the Physics in Industry Day	All



Ms Lungelwa Kula presenting.



Prof Ernest van Dyk



Mikhail Sakharov and Prof Simon Connell.

Monitoring Evaluation and Impact Assessment Workshop at SAIP2019

The IOP UK facilitated a 2-day workshop on Monitoring Evaluation and Impact Assessment for SAIP during SAIP2019 on 10 and 11 July at The Ranch Hotel in Polokwane. Delegates who attended SAIP2019 and also involved with either the teacher development project or the SAIP Hub and Spoke projects, were invited to participate in the IOP facilitated workshop.

Drendon Secondary School on July 10th. The Dendron Secondary School is situated in Bochum East, Polokwane, Limpopo, and was established in 1999. The Drendon Secondary School is a top achieving school in the Limpopo province with close to 100% Matric pass rates. The school, having produced the top learner in Limpopo Province in 2010, has gone on to achieve even greater results by featuring at least 4 learners in the National Top 20 Matriculants in 2012, 2013 and 2015, respectively.

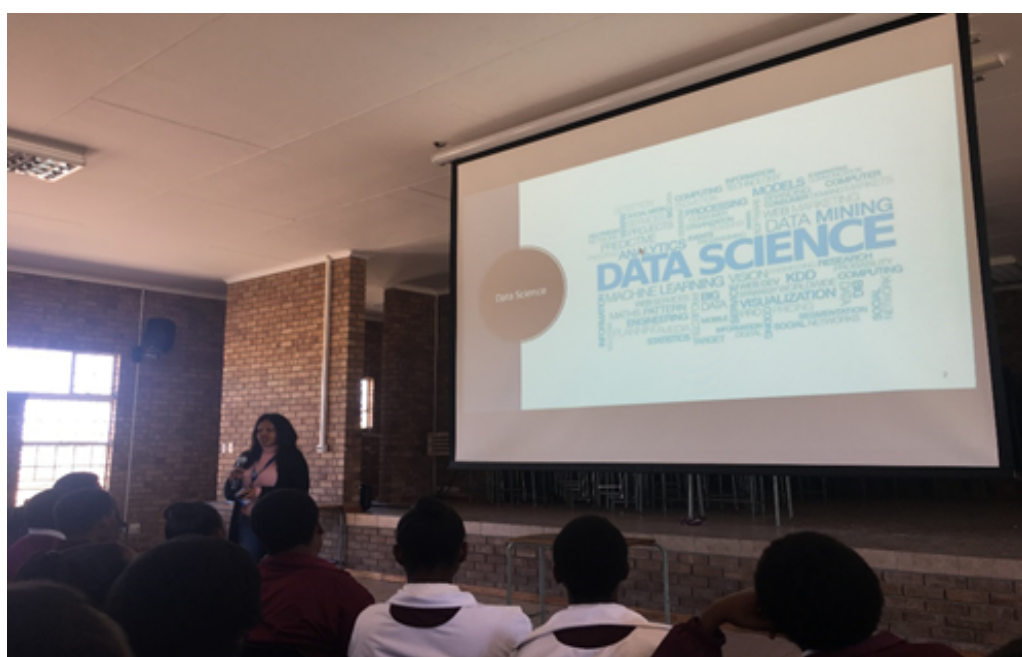
The event was organized by Phuti Ntsoko Rapheeha, a MSc student at Wits University, who is wrapping up his thesis on the search for particles in the universe with the ATLAS detector at the European Laboratory CERN. Phuti is a graduate of the Drendon Secondary School, where he was a top student and learned to work tirelessly.

These MSc and PhD students are trained at the European Laboratory CERN, with a program funded by the South African Department of Science and Technology (DST). The SA-CERN program is hosted by iThemba LABS of the National Research Foundation (NRF). Students get exposed to the state-of-the-art fundamental research in physics, electrical engineering, computer science and other fields. Students acquire invaluable skills in high-tech, programming, Big Data, data analytics, Machine Learning. These skills are pivotal to prepare the country for the 4th Industrial Revolution.

Below is a picture of the delegation of MSc and PhD physics students taken with the Principal of the Drendon Secondary School, Mr. Moloko Knox Matsapola.



Following an introductory meeting with the Principal, the delegation proceeded to the school's hall. Four keynote presentations were made by graduate students that are originally from Limpopo: Nkateko Baloyi (MSc), Mpho Gololo (PhD), Nthabiseng Lekalakala (MSc) and Phuti Ntsoko Rapheeha (MSc). The event was very well attended by learners, who in fact showed enviable enthusiasm and paid close attention to the keynote presentations, as one can appreciate in the picture below:



Nthabiseng Lekalakala, a physics MSc student at Wits University, gave a keynote presentation about her work in the area of high-tech related to fast electronics that she does at the ATLAS detector at CERN. Fast electronics is necessary to perform very fast processing of very large amounts of data. This is the first stage of the Big Data problem that is usually referred to as real-time processing. She has contributed to the maintenance and refurbishment of the read-out electronics of the detector in collaboration with physicists and engineers from all over the world.



Mpho Gololo, who holds a MSc degree in electrical engineering in Japan and is currently performing his PhD research with Wits University, is now at CERN. Mpho performs research in cutting edge technologies related to fast electronics and data processing. He is contributing to the upgrade of one of the subcomponents of the ATLAS detector at CERN. He collaborates with top-notch engineers and physicists from all over the world and he is eager to bring high-tech knowledge to South Africa.

Mpho gave a keynote speech about the relevance and benefits from artificial intelligence and why it is important that learners prepare themselves thoroughly to face the challenges of the 4th Industrial Revolution. In the picture Mpho is seen explaining to the learners what is the 4th Industrial Revolution.

WiPiSA Outreach Programme for Eastern Cape August 2019

Contribution by: Onesimo Mtintsilana (2018-2020 WiPiSA Student Rep)

On behalf of the WiPiSA forum I would like to thank the SAIP for the opportunity to allow me to host an outreach programme in the town, Egcuwa located in the rural outskirts of the Eastern Cape. The programme ran from the 5th Aug until the 8th Aug 2019. It was a beautiful with success with some challenges as well. I visited a total of 7 schools, where 99% of the schools were quintile 2. I was received well, all the students (including educators) enjoyed the talks and experiments I demonstrated as most of them had never had external visitors coming to the schools to talk about science. In the primary schools, I conducted “fun” physics experiments where students engaged whereas in high schools, it was a formal presentation and I handed out informative pamphlets. Engagement was received from both learners and educators, as most of the information was new to them.

However, there were some challenges that I faced such as roads unsuitable for a small car and there was also no water (which made it difficult to conduct the experiments). Due to limitations on budget, the experimental equipment I used was from my own money (more funding opportunities are needed for WiPiSA).

Despite all the challenges the outreach was a success and it indeed helped the learners to learn about opportunities available in physics.

This was not only a learning opportunity for the schools but for me as well. I hope in the near future, there will be more outreach programmes focused on.

SAIP-SAASTA Mastec Teacher Training Workshop Report (15-18 July 2019)

By Ndanga Mahani

A 4-day SAIP-SAASTA Teacher Training Workshop was held at Mastec, Seshego in Polokwane. The workshop was funded by SAASTA in partnership with Limpopo Provincial Department of Education as part of Pre-National Science Week Science Engagement Programme. The South African Institute of Physics (SAIP) current strategic focus is on improving the physics education pipeline. In line with this strategy, the SAIP is implementing projects such as Physics Teacher Development to enhance the skills of physics teachers in content. By leveraging the SAIP Annual Conference as a vehicle for promoting science engagement and leaving a legacy within the host geographic area.

1.1 Planning

The idea emanated from discussions with various stakeholders at ASTEMI COP Conference that was held in February 2019. During planning it was agreed that SAASTA will fund a two-day workshop for a maximum of 100 educators from each of the two districts (Polokwane and Lebowakgomo). Mastec, a former college of education, was confirmed as the venue of the workshop. The team leaders chose possible facilitators. Each team member was requested to choose a topic from the DBE programme. Facilitators who attended the SAIP2019 Conference had a planning meeting at the conference venue and another one a day before the training started, Sunday 14 July 2019 at Park Inn Hotel in Polokwane.

1.2 Implementation

The educators came from Capricorn North and Capricorn South districts, each of the two groups were accompanied by the district officials. Each district group attended a two-day workshop. There were four classrooms allocated for the workshop, three used for facilitation and the fourth one was used by facilitators for their preparations.

Facilitators who shared the same topics would assess their presentations and if there was need, they planned lessons together. They shared materials and attend classes together. Even planning sessions served to plan problems that best suit the educator's questions and decide on which ones to use in class the next day.

Mr Moloko Matlala from SAASTA oversaw the workshop for the first two days. Thereafter James Tlhabane oversaw activities. The two SAASTA delegates also had an opportunity to address educators on projects that SAASTA have that can benefit both learners and educators. They both emphasised the importance of participation in projects such as the National Science Week, National Olympiad as well as the Natural Science Olympiad.

Content focus

Physics: (Electricity/Electrodynamics / Magnetism Optical Phenomena/ Work, Energy & Power)

Chemistry: (Electro-chemical cells/Reaction Rate/Acids&Bases)

1.3 The Team

Facilitating team members were from the following institutions; University of Johannesburg, University of Limpopo, University of Venda & the Institute of Physics UK. The team had facilitators from both Chemistry and Physics Departments.

Name	Institution	Subject	Topic
Prof Thuto Mosuang	University of Limpopo	Physics	Electrodynamics
Mr Molamo Ally Letsoalo	University of Limpopo	Physics	Optical Phenomena
Mr Netsianda Makondelele	University of Limpopo	Physics	Work, Energy and Power
Dr Vusi Ludwig Mulaudzi	University of Limpopo	Chemistry	Electro-chemical cells and Reaction Rate
Ms Mmaphefo Patricia Mothapo	University of Limpopo	Chemistry	Acids & Bases
Dr Eric Maluta	University of Venda	Physics	Electricity
Dr Joseph Kirui	University of Venda	Physics	Electrodynamics
Mr Solomon Ravhengani	University of Venda	Physics	Electrodynamics
Mr Ephraim Ramurafhi	University Venda	Chemistry	Electro-chemical cells and Reaction Rate
Dr Lordwell Jhamba	University of Venda	Physics	Optical Phenomena
Mrs Sophie Mulaudzi	University of Venda	Physics	Work, Energy Power
Mr Patric Monama	University of Johannesburg	Chemistry	Acids and Bases, Electro-chemical cells and Reaction Rate
Prof David Wolfe	IOP UK/ International Collaborator	Physics and Chemistry	Electricity and Magnetism
Ms Ndanganeni Mahani	SAIP	Coordinator	

Conclusion

The workshop went well with the hands-on assistance from all stakeholders involved. All showed respect during the workshops and there were no major issues. The district officials from both Capricorn North and South were hands on during the training. They rotated during classes to attend and assisted in administering registers and questionnaire.

A SACE register was kept so that educators could claim CPD points for the workshop. Some of the educators requested possible partnership with the Limpopo based facilitators (UL & Univen). A visit to Vuwani Science Centre & UL took place so that their learners could be exposed to practical demonstrations. The zeal and passion from educators during classes were evident, with some even challenging the facilitators.

The SAIP would like to thank SAASTA for their generous funding support for the workshop. The workshop was a huge success, assisted by the selfless kind donation of the 4 classes used by the Mastec centre personnel. The district officials of sampled educators went beyond their line of duty to make sure all was well.

The facilitators gave their best, starting with preparation which ended late at night each day. Some left their offices for more than 2 weeks as they attended the SAIP2019 Annual Conference as well as including our international collaborator who flew all the way from London UK. Special gratitude to Mr Mukweho who arranged all logistics for the educators since the planning meeting. Capricorn North attendance was 102 (educators and district officials) total whilst Capricorn South was 76 (educators and district officials).



Sunday Facilitators' Planning Meeting at the hotel.



Official Opening for Group1, from right to left; Mr Mukwevho introducing Dr Tsanwani (Head, Mastec Centre)



Capricorn North Team and facilitators group photo.



Facilitators with Mr Matlala and SAIP coordinator.



Last day facilitators group photo.

SAIP National Science Week 2019 – “Physics and Climate Change”

The Department of Science and Technology (DST) annually leads the National Science Week (NSW) - a celebration of the role of science in people’s daily lives. This mass-participation event is one of the many initiatives undertaken to implement the Science Engagement Strategy (2015) of the DST, which seeks to develop a society that is knowledgeable about science, able to form independent opinions about science issues and scientifically literate. The NSW 2019 theme is “Facing the harsh realities of Climate Change”..

In line with this year’s theme, the SAIP ran events under the banner ‘*Physics and Climate Change*’. The SAIP presented some resources on how physics research is helping us understand climate change and how physics is also helping us mitigate the effects of climate change, hence improving our quality of life and saving the planet!

Please download and share the resources below;

1. Pre-recorded Public Talk on ‘Climate Change A Physics Perspective’ link: <https://drive.google.com/file/d/1S9R6VCmS6iI5-FydLw66WfxRpyweYcrH/view?usp=sharing>
2. NSW PowerPoint Presentation on Physics & Climate Change link: <http://saip.org.za/images/NSW2019%20Physics%20of%20Climate%20Change%20Final.pptx>
3. Summary of Physics & Climate Change Audio Mini Clip link: <http://saip.org.za/images/Physics%20%26%20Climate%20Change%20Summary.m4a>

SAIP NSW 2019 Activities

Activity 1: SAIP Developed a Pre-recorded Public Talk on 'Physics of Climate Change and how physics can help mitigate climate change' also a Recorded PowerPoint Presentation was compiled, designed and distributed.

Activity 2: SAIP coordinated the bookings of multiple radio talks by physicists with the main discussion centred around Physics of Climate Change

Activity 3: SAIP ran a high school quiz on Physics and Climate Change on 19 August 2019.

NSW 2019 Statistics

SAIP participated in NSW 2019 with various activities that include the SAIP developed resources that were distributed, physics specialists giving talks on radio about the benefits physics research has brought to our understanding climate change and its impact school visits, and a Physics of Climate Change Quiz for learners. This year our 3 activities covered 7 provinces.

Category	Number
Learners	574 (2484 learners on mailing list)
Educators	105
Other (includes researchers, academics & students)	4177 SAIP Mailing list
Facebook Posts (1 Post)	621 People Reach
General Public (Number is large due to 7 coordinated Radio Programmes)	± 2 545 000

WiPiSA (Women in Physics in South Africa) Departmental Lunches

Call for the 2019/2020 WiPiSA lunches

The WiPiSA Executive Committee is making a call to Physics HoD's / Departmental Reps by inviting female academics and postgraduate students to apply for the 2019/2020 WiPiSA Lunches at their respective institutions. To meet its objectives, WiPiSA committee initiated an idea to have departmental lunches across universities within South Africa.

For more detailed info kindly follow this link: <http://www.saip.org.za/images/2019-call-wipisa.pdf>

For enquiries, contact Dr Sylvia Ledwaba raesibe.ledwaba@ul.ac.za or call +2715 268 4905

SAIP 2018 Conference Proceedings published

The Proceedings of SAIP2018, the 63rd Annual Conference of the South African Institute of Physics, with ISBN: 978-0-620-85406-1, was published on 18 November 2019.

The Proceedings of SAIP2018 will only be available electronically. To access the SAIP2018 Proceedings page, please click through to: <http://events.saip.org.za/internalPage.py?pageId=10&confId=100>

SAIP Gold Medal nominations for 2020

The SAIP Gold Medal award is made for outstanding achievements in any of the following facets of any branch of Physics: research, education, technology and industrial development. As the highest standards are applied, the award is intended to be the greatest distinction that is conferred in South Africa for achievements in Physics. Only work done by a South African citizen or South African resident shall be considered for this award. The work must have been done in South Africa or during a temporary visit abroad.

A call for nominations for this prestigious award will be made early in 2020.

Like the SAIP Facebook Page

Like the SAIP Facebook page to stay in touch with the latest news, events and job opportunities within the South African & International Physics Communities.

If you have interesting physics related activities, events and opportunities you want to be posted please let us know and share those great moments with the community.

<https://www.facebook.com/South-African-Institute-of-Physics-1660099704207118/>

Connect with SAIP on LinkedIn

The physics community can now connect with SAIP on LinkedIn click on the link below to connect with friends in physics community in South Africa: <https://www.linkedin.com/company/18078401/>

Happy networking!!

CRITICAL SKILLS VISA LETTER

The South African Institute of Physics is now a SAQA registered professional body hence it can provide critical skills letters required for the application of a Critical Skills VISA and Permanent Residence Permits to Registered Professional Physicist.

An application for a Critical Skills Work Visa has to be accompanied by proof that the applicant falls within the critical skills category and the following;

1. A confirmation, in writing, from the professional body, council or board recognised by the South African Qualifications Association (SAQA), in terms of Section 13(1)(i) of the National Qualifications Framework Act, or any relevant government department confirming the skills or qualifications of the applicant and appropriate post qualification experience.
2. If required by law, proof of application for a certificate of registration with the professional body, Council or board recognised by SAQA in terms of Section 13(1)(i) of the National Qualifications Framework Act.
3. Proof of evaluation of the foreign qualification by SAQA and translated by a sworn translator into one of the official languages of the Republic. SAIP is recognised by SAQA and can provide you with the confirmations you require to comply with requirements 1 and 2 above.

Register as a Professional Physicist with SAIP

The SAIP is inviting its members to register as Professional Physicists (Pr.Phys) with SAIP.

- The short abbreviation for the designation will be Pr. Phys.
- A member registered with SAIP as a Professional Physicist can use the letters Pr.Phys after their name, e.g. George Brown Pr.Phys.

Who can apply?

Physics is a basic science that is a basis for all science and technology disciplines. This results in its graduates working in every sector imaginable. Therefore, we must cater for a wide range of industries and economic sectors. Hence any physicists who graduated with at least Physics Honours Degree working in either; industry, commerce, government, academia, research, theoretical physics, experimental physics, and uses physics skills and thought processes in their job/career. A person first has to qualify to be an SAIP Ordinary member before they can be registered as a professional physicist.

This designation will represent the highest standard of professionalism, competence and commitment to keep pace with advancing knowledge in the field of physics. It is hoped this designation will give a professional standing and recognition of physics by the South African society.

Justification

Academic qualifications are only the beginning of a career in physics and its applications. The need for continuing professional development is widely recognised to be the mechanism by which professionals maintain their knowledge after the formal education process has been completed. Pr.Phys demonstrates a commitment to maintaining competence, continuing your professional development and abiding by an acceptable code of conduct.

Benefits to physicist

- The certification as a Professional Physicists will be an important addition to a physicist's personal credentials.
- When competing for a job the designation will distinguish one from other applicants with similar qualifications but no professional designation

Benefits for employers

- Supports the recruitment process many recruiters these days want to know if one has a professional designation
- Can be used as criteria for promotion, skills and salary benchmarking
- Demonstrates to someone who possesses this designation believes in professionalism, continuous skills development, belonging to a professional body and acceptable ethical standards

Register as Professional Industrial and Physical Science Technologists (Pr.PhysTECH)

Pr.PhysTECH Designation: The SAIP would like to inform the physics community that a second professional designation, the Professional Industrial and Physical Science Technologists (Pr.PhysTECH) has now been registered with SAQA under professional designation ID: 899.

Pr.PhysTECH registered members also qualify to request a critical skills VISA support letter from SAIP. Pr.PhysTECH will cater for applied physicists, industrial physicists, technicians and technologists and graduates with physics-based qualifications working in academia, research and industry; who apply physics-based scientific-methods, techniques, concepts and principles in research, testing, measurement, monitoring, design, and installation of equipment, products, and processes.

For more information, visit: <http://www.saip.org.za/index.php/news-and-events/opportunities/442-professional-industry-and-physical-science-technology-registration>

SAIP Continuous Professional Development (CPD) System

The SAIP has launched a Continuous Professional Development (CPD) system from 5 September 2019 to help Pr.Phys and Pr.PhysTECH members to record and track their continuous professional development activities. The SAIP CPD system is available online at: <http://cpd.saip.org.za>.

All registered Pr.Phys and Pr.PhysTECH will have received their login details to the CPD system via e-mail from the SAIP Office. If you have a professional designation registration, and have not received your login details or have trouble logging in please contact: tebogo.mokhine@saip.org.za.

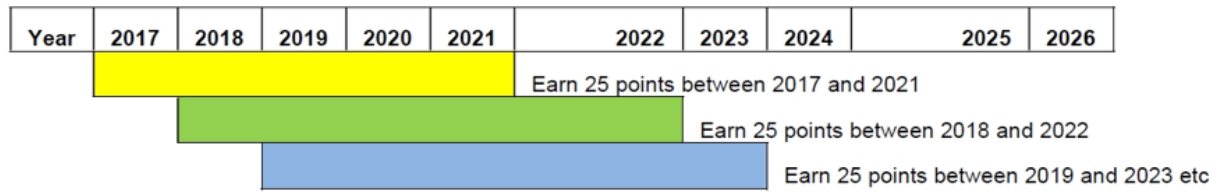
The SAIP by-laws (in sections 1.9 and 1.10) outline the policy on Pr.Phys and Pr.PhysTECH CPD minimum requirements (http://cpd.saip.org.za/material/SAIP_ByLaws_07_July_2017.pdf).

The CPD system shall run in 5-year cycles, during which period each professional physicist shall be required to accumulate a minimum of 25 credits in order to retain registration as a professional;

- a) In any one year, the professional physicist shall be required to accumulate a minimum of 5 credits;
- b) Extra credits earned in any one year may be carried over to the subsequent year until the end of the five-years (example below);



c) The five-year period will be a rolling five-year cycle such that in each rolling five year cycle a person must have 25 points, see illustration below;



d) The five-year period will be a rolling five-year cycle such that in each rolling five year cycle a person must have 25 points, see illustration below;

The SAIP council is extending a blanket exemption to all Pr.Phys and Pr.PhysTECH registered between January 2015 and August 2019 on CPD requirements for these 4 years because the SAIP CPD system was not yet operational. That means all members will be assumed to be compliant up to the time the CPD system is launched.

1. When you login you will see that all years are compliant
2. You can start uploading your CPD points and evidence
3. If you earned more than 5 CPD points between 2016 and 2018 you can edit and upload them so that excess points are carried over to the subsequent current years.

You are also invited to suggest and alert us to CPD activities taking place that you want us to publicise on the system under Suggest CPD activities on the system.

JOIN SAIP MEMBERSHIP

Physics is a basic science that is a basis for all science and technology disciplines. This results in physics graduates working in every sector imaginable. Therefore, SAIP caters for a wide range of industries and economic sectors.

SAIP membership includes any physicists who graduated with at least physics related degree working in either; industry, commerce, government, academia, research, theoretical physics, experimental physics, and uses physics skills and thought processes in their job/career.

Why Professional Membership is Important

Academic qualifications are only the beginning of a career in physics and its applications. The need for continuing professional development is widely recognised to be the mechanism by which professionals maintain their knowledge after the formal education process has been completed. By becoming a member of a professional society, one demonstrates their commitment to maintaining competence in their field through continuing your professional development from activities such as conferences, schools and workshops and abiding by an acceptable code of conduct. Membership of a professional society is an important addition to a physicist's personal credentials for example when competing for a job membership of professional society will distinguish one from other applicants with similar qualifications but no professional affiliation.

1. **Stay informed** - News flashes and alerts to are sent directly to your email. A quarterly magazine, Physics Comment, will keep you briefed on physics news, government policy and jobs in industry and academia.
2. **Specialist Groups and Networking** - Through the various activities of SAIP, networks have been established with the African and International Physics communities, to benefit all our members. You'll make important new contacts and forge lifelong professional relationships by getting involved in a specialist group.
3. **Save Money** - You'll receive discounted rates for SIAP conferences, and have the benefit of paying affiliate membership fees for IOP membership.
4. **Employment opportunity information** -Job advertisements will be displayed on our new website and mailed to members from time to time.
5. **Access to current information on sources of funding grants and scholarships** - Exclusive service provided to our members via a direct email system.
6. **Scientific meetings** - The annual conferences and workshops provide learning opportunities for different specialisation areas and varying degrees of experience.
7. **Especially for the global physics community** - You'll have the opportunity to partake in events organised by the SAIP for the Physics community in South Africa as well as Africa: developmental workshops, schools, and conferences.
8. **Additional resources** - Your membership privileges also include information and guidance when applying for and acquiring visas to study, participate in the scientific meeting and research opportunities in South Africa and abroad. There is also an exclusive member-only area on our website.
9. **Career guidance and resources**- Career assistance is provided to all members to find their career path in industry or academia.
10. **Opportunities to win awards for excellence** - SAIP recognises contributions to physics in SA by awarding two different medals and various student prizes at the annual conference.
11. **Teaching and Learning Resources for schools** - As part of our growing outreach programme we provide teachers and learners with the tools and opportunities to allow and motivate more learners to follow careers with physics as a background

JOIN SAIP TODAY CLICK THE LINK BELOW FOR MORE INFORMATION ON HOW TO APPLY:

<http://www.saip.org.za/index.php/members/membership-info>

Meeting the challenges of research across Africa

Seven researchers from African nations discuss the career implications of developing their research at home or abroad

Published in Nature 572, 143-145 (2019), <https://doi.org/10.1038/d41586-019-02311-2>

Any global perspective on the future of science must include Africa, home to 1.3 billion people and some of the planet's most abundant resources, both physical and intellectual.

Nature spoke to seven African researchers about their careers and their vision for science on the continent. Some had attended the inaugural Young African Scientists in Europe conference in Toulouse, France, in July 2018. The first Young African Scientists in North America event takes place in Montreal in May 2020.

Whether they stayed in their home countries or moved for work and study, they share a belief that Africa has vast potential to go with its challenges.

SALMA SYLLA MBAYE: From Senegal to the stars

PhD student in astronomy at Cheikh Anta Diop University, Dakar.



*Astronomy PhD student Salma Sylla Mbaye hopes to support and advance astronomy research in Senegal.
Credit: Omar Ouchaou*

In 2017, I became the first astronomy PhD student in Senegal. I've been fascinated by stars and space ever since secondary school, but I had never really thought about pursuing a PhD because I didn't know anyone who had even tried. I had a meeting with Katrien Kolenberg, an astrophysicist from the Catholic University of Leuven in Belgium who visited Senegal for an international gathering of physicists, and she inspired and supported me to pursue astrophysics. My PhD programme is created in part by the Africa Initiative for Planetary and Space Sciences, a continent-wide effort to promote astronomy and related research.

A lot of students in Senegal are interested in science and astronomy, but they don't have the access to telescopes, computers or learning opportunities to pursue those interests. Apart from a few guest lecturers, astronomy isn't even taught at the undergraduate level. But the outlook is improving. In 2018, Senegal was involved in a historic step in the exploration of the Solar System. NASA sent a team of astronomers and telescopes here to work with local scientists to observe a distant asteroid from the Kuiper belt as it passed in front of a star. Senegal was in the right place to view the 'stellar occultation', and it's also a relatively stable country with dark skies. That event got a lot of young people excited about astronomy.

An observatory is now under construction in Dakar, which is a huge step forward for Senegal. I want to be a part of the future of astronomy in my country. I want to help develop a network of local and international astronomers who can share information and training, and create skills. We need better organization and more collaboration with other African countries or international partners. We can do more.

PANKYES DATOK: Study abroad to tackle challenges at home

PhD student in hydrology and biogeochemistry at Paul Sabatier University, Toulouse, France.

I'm studying carbon inputs and other human impacts on the Congo River basin, the second-largest basin in the world. It is an incredibly important watershed for people, and has a diverse array of wildlife — and it's under threat. Although a general environmental awareness is gradually creeping into Africa, there's a long way to go. Standards for pollution control remain very low. I've seen oil spilt directly into the water, but we don't have the tools to measure the impact of these spillages.

You need hydrological data to do any sort of water-resource planning, but we lack even the most basic details, such as water flows and temperatures. We just don't have the water gauges and other scientific infrastructure. And with all of the fighting and political strife in the Congo basin, it's a dangerous place for researchers. I just had to cancel a trip to the river because the authorities in the Democratic Republic of the Congo were concerned for my safety.

I still go back to my home country of Nigeria occasionally to lecture at the Alex Ekwueme Federal University Ndufu-Alike in Ikwo. The students always ask me if they should stay in Africa or try to study overseas. It's a constant topic of conversation. I tell them that they should try to go out in the world if they want respect. We have researchers in Africa who do great things, but they aren't always recognized. There's a saying: a prophet is not known in his own house. Maybe, in the future, Africa will be a leading destination for researchers from other parts of the world. But, for now, we need some scientists who are willing to go overseas to mobilize African science for Africa. Even if scientists leave the continent, they are still connected. Go east, west, north or south — home is home.

EVERLYN GITAU: A critical mass of African scientists

Director of research capacity at the African Population and Health Research Centre, Nairobi.

In my work at the centre, I spend a lot of time helping researchers from around the continent to get the funding they need. We take a broad view of the issues that affect population health, including climate change, reproductive health and sanitation, and we try to identify the most pressing issues where funding will produce the most positive results.

Collection: How to move lab

Sanitation is a major concern. We've found that the engineers being trained today don't have the capacity to address the needs of a growing population.

For example, the universities still teach them how to build sewer systems, but new sewer systems are very expensive. Countries should be looking at alternatives to sewers, but it's difficult to find African engineers with the right knowledge and training.

One of the biggest challenges is a lack of scientists. A back-of-the-envelope calculation is that Africa needs to be producing about 1,000 PhD graduates in the sciences per million people every year to address the pressing needs of the continent. We're producing only about 300 each year in Kenya, a country of about 50 million people. We need to keep building that science pipeline and encourage more researchers to stay on the continent.

We have to make sure that policymakers are ready to use evidence to make laws and funding decisions. They also need to recognize the importance of African science. Instead of looking to outsiders for information and expertise, governments could start supporting researchers on the continent.

I understand why some researchers leave Africa. But to actually make real change, we have to have a critical mass of researchers working here. African scientists have managed to make great progress in places where it is most needed. They can do it.

REGINA MAPHANGA: We can't give up

Computational materials scientist at the University of Limpopo in South Africa.

I grew up in the rural South African village of Ngwanallela. We didn't know about careers in science. Most kids wanted to grow up to be teachers, doctors or in the police. But they had the potential to be scientists. Humans are equally gifted, but our environment and resources differentiate us.

Personally, I think Africans don't always do enough to promote science in their own continent. A researcher came from the University of Oxford, UK, to study how people use different signals to hail taxis in different locations. It's perhaps not the most important topic, but it made me think: 'Why wasn't a local person doing that study?' We can't outsource everything.

One challenge is that it's hard for young researchers to obtain funding that they need to get started. But the established researchers — the ones who tend to get most of the grants — are getting older. If we don't prepare the younger generation to take their place, we're going to be in a dire situation. We can't just fold our arms and say the system isn't working. We need to keep trying. For example, we now have funding schemes that are targeted at younger researchers. That happened because the government and policymakers heard the message.

There could be a time when we realize that we can be as good as the rest of the world, but it will take time.

STÉPHANE KENMOE: *An army of science champions*

Computational chemist at the University of Duisburg-Essen in Germany.



*Computational chemist Stéphane Kenmoe from Cameroon wants to point young people towards science.
Credit: International Centre for Theoretical Physics*

People in my home country of Cameroon can do excellent science, but scientists are often treated as if they're exceptional, almost one of a kind. I don't like that. I make YouTube videos about science, and I'm frequently interviewed on Cameroonian television where I talk about the great research being done here. I want to inspire young people to realize that they can do science too. My long-term goal is to build an army of science champions — not just researchers but also journalists, actors and athletes — who will promote science wherever possible.

The main problem for students in Cameroon is that they don't know how to apply for universities or start careers in science. And it's not all their fault. The people who went before them don't do enough to talk about their experiences. I'm trying to help change that by sharing my story.

I got my big break when I was recruited for training at the International Centre for Theoretical Physics (ICTP) in Trieste, Italy. I worked hard there and was accepted into the PhD programme at the Max Planck Institute for Iron Research in Dusseldorf, Germany. If you want to go to an elite institution, you have to build your credentials and gain the trust of the organization. Training with the ICTP or the Next Einstein.

Initiative, a continent-wide programme run by the African Institute for Mathematical Sciences, can really help launch a career (see 'Find the money').

I work on topics that are closely aligned with the needs back home. My home village of Fongo-Tongo is in an area that is rich in minerals. Locals complain about people from Western countries spoiling the ground with mining operations, but we don't even know how to make the most of our own resources. At the ICTP, I did computational condensed-matter research to better understand the properties of our native minerals. Now I'm working on producing hydrogen fuels from water using sunlight, an abundant resource in tropical countries.

I would eventually like to come back and do my research at home. But right now the facilities are too poor. You couldn't do a three-year computer project in Cameroon. You wouldn't have enough reliable electricity. We need the army of science champions to talk to the politicians. Otherwise we'll never move forward.

VERONICA OKELLO: Coming back to Kenya

Analytical chemist, Machakos University, Kenya.

In 2008, I left Kenya to pursue a PhD at Binghamton University in New York. It was very hard. My husband and my two boys — aged 3 and 5 — stayed behind. The sacrifice was worth it. We don't have adequate labs, equipment or technology here in Kenya. I had a friend who went to Binghamton before me. She told me about the projects she was doing and the equipment she was using. I decided to apply. To excel in a field, you have to have the resources to do great research.

At first, I didn't plan to continue my career in Kenya. But I came back every year to visit my family. When I looked around, I saw a lot of things that I would like to change if I could, especially the public's lack of basic knowledge about chemicals. Many institutions in Kenya just throw chemical waste down the drain. My speciality is environmental remediation, so I thought I could make an impact if I stayed at home. Not only could I help clean up pollution, but I could also spread awareness about the proper handling and storage of chemicals.

Africa has a lot of challenges, but most of them can be solved by Africans. They understand the problems much better than do people from elsewhere. The solutions don't always require high-tech innovations. We need simple applications to address things that really matter. For example, we have a problem with too much natural fluoride in the water. Perhaps an African scientist could develop a simple tool to remove the fluoride ions. That would be more helpful than some ultra-sophisticated research that doesn't solve anything.

EDWARD JURUA: Starting from scratch

Physicist and founder of the astronomy programme at Mbarara University of Science and Technology in Uganda.

The biggest challenge I had in starting a new astronomy programme was recruiting faculty members. They had to come from elsewhere because astronomy was not previously offered in any university in Uganda, and our lack of financial resources made recruitment difficult. At first, I was the only faculty member, but I've found collaborators who are willing to teach some courses. Thanks to that effort, the university now offers both undergraduate and doctoral degrees in astronomy. Finding students who wanted to pursue those degrees was relatively easy. After they learn about the possibilities, they are very motivated.

It was my dream to establish astronomy in my home country of Uganda. The government is really starting to embrace science and technology as a way to encourage economic development. Uganda has even taken the first steps towards building a space programme. Our university programme will be closely involved with that venture. It's a new era of science in Uganda, and I'm proud to be a part of it.

Important results from MeerKAT

South Africa's MeerKAT discovers giant radio bubbles at centre of Milky Way

An international team of astronomers using the MeerKAT telescope has discovered enormous balloon-like structures that tower hundreds of light-years above and below the centre of our galaxy. Caused by a phenomenally energetic burst that erupted near the Milky Way's supermassive black hole a few million years ago, the MeerKAT radio bubbles are shedding light on long-standing galactic mysteries.

The SRAO press release (including excellent images):

<https://www.ska.ac.za/south-africas-meerkat-discovers-giant-radio-bubbles-at-centre-of-milky-way/>

Nature news story: <https://www.nature.com/articles/d41586-019-02726-x>

Associated paper: <https://www.nature.com/articles/s41586-019-1532-5>

Nine-hour X-ray quasi-periodic eruptions from a low-mass black hole galactic nucleus

A second MeerKAT related paper was also published in Nature:

Associated: <https://www.nature.com/articles/s41586-019-1556-x>

Astronomers capture first image of a black hole

Posted on April 10, 2019

The Event Horizon Telescope (EHT) — a planet-scale array of eight ground-based radio telescopes forged through international collaboration — was designed to capture images of a black hole. Today (10 April), in coordinated press conferences across the globe, EHT researchers reveal that they have succeeded, unveiling the first direct visual evidence of a supermassive black hole and its shadow.

This breakthrough was announced today in a series of six papers published in a special issue of *The Astrophysical Journal Letters*. The image reveals the black hole at the centre of Messier 87, a massive galaxy in the nearby Virgo galaxy cluster. This black hole resides 55 million light-years from Earth and has a mass 6.5-billion times that of the Sun.

The EHT links telescopes around the globe to form an Earth-sized virtual telescope with unprecedented sensitivity and resolution. The EHT is the result of years of international collaboration, and offers scientists a new way to study the most extreme objects in the Universe predicted by Einstein's general relativity during the centennial year of the historic experiment that first confirmed the theory.

"We are giving humanity its first view of a black hole — a one-way door out of our Universe," said EHT project director Sheperd S. Doeleman of the Center for Astrophysics, Harvard & Smithsonian. "This is a landmark in astronomy, an unprecedented scientific feat accomplished by a team of more than 200 researchers."

Black holes are extraordinary cosmic objects with enormous masses but extremely compact sizes. The presence of these objects affects their environment in extreme ways, warping spacetime and super-heating any surrounding material. "If immersed in a bright region, like a disc of glowing gas, we expect a black hole to create a dark region similar to a shadow — something predicted by Einstein's general relativity that we've never seen before," explained chair of the EHT Science Council Heino Falcke of Radboud University, the Netherlands. "This shadow, caused by the gravitational bending and capture of light by the event horizon, reveals a lot about the nature of these fascinating objects and allowed us to measure the enormous mass of M87's black hole."

More information at:

https://www.up.ac.za/news/post_2802266-university-of-pretoria-astrophysicist-part-of-team-involved-in-capturing-first-black-hole-image-

International recognition of Emeritus Physicists

Professor Arthur Every (Wits) received the "Golden Whistle Award", which is the International Congress on ULTRASONICS Distinguished Service Award for outstanding contributions to the promotion of the Ultrasonic World Community, in September 2019, Bruges, Belgium. The whistle is a golden coloured tri-tone Samba whistle with a strong overtone spectrum in the ultrasonic frequency range. The whistle symbolizes leadership in ultrasound.

Professor Darrell Comins (Wits) received the Radiation Effects in Insulators Award (REI) in recognition of, and to honor a dedicated lifetime of scientific research, both fundamental and applied, into the effects of radiation in insulating materials, over a broad and encompassing field. In unanimously recommending this biennial award, the international REI community also pays tribute to the remarkable personal energy, determination, humor and pedagogic excellence always displayed in the making of so many new and far-reaching contributions (Nur-Sultan, Kazakhstan, August 2019).

Wits PhD student wins international prize for best journal article in JOSA A

Wits PhD student Nokwazi Mphuthi has won an international prize from the Journal of the Optical Society of America A (JOSA A), for the best journal article for by emerging researcher in 2018.

Mphuthi, who is a third-year PhD student working on a collaborative project with the Structured light group at Wits and the South African Radio Astronomy Observatory: HartRAO, won the prize for an article that she submitted to the journal, entitled “Are Bessel beams resilient to aberrations and turbulence?”.

This article aimed to disprove a long-held myth in the field of optics that Bessel beams are self-healing and can reconstruct in the spatial profile after all forms of obstructions. Bessel beams are a kind of wave form that are non-diffractive in nature, meaning they can maintain their size as they propagate, as opposed to normal light and sound waves that spreads out after being focussed on a small spot. Mphuthi’s article showed that Bessel beams are in fact not self-healing after encountering phase changing disturbances.

“For Bessel beams to be self-healing, the obstruction needs to be non-transparent and small in relation to the beam size, and this can’t be translated to atmospheric turbulence, which is a phase disturbance,” says Mphuthi. Mphuthi built a small aberration disturbance for a Bessel beam in the Structured Light Laboratory in the School of Physics at Wits and found that this obstruction interfered with the beam, which proved that the beam was not self-healing. She then created a much larger atmospheric disturbance to test the Bessel beams with.

“All the conical waves that create the Bessel beam were disturbed by the atmospheric disturbance, which eliminated any chance of reconstruction (or self-healing) of the beam,” says Mphuthi. The experiment not only disproved the myth, but also described under which circumstances the self-healing capabilities of Bessel beams are true.



Mphuthi is a PhD student with a BSc in Land Surveying from the University of KwaZulu-Natal. As part of her MSc project, she worked on a project in collaboration with the South African Radio Astronomy Observatory: HartRAO (South Africa), NASA (USA), and Observatoire de la Côte d'Azur (France) to develop the first Lunar Laser Ranging (LLR) system in the Southern Hemisphere. An extension of the LLR work to increase the efficiency of the system paved the way for collaborations between the Structured Light lab at the University of the Witwatersrand and HartRAO. The project aims to increase the photon return rate of laser ranging systems using structured light.

“Because of the long distance between the Earth and the moon a lot of light is lost due to spreading and atmospheric disturbances, so we approached the Structured Light Laboratory to see if we can improve the system efficiency by using sending structured light beam to the moon instead of the traditional Gaussian beam ,” says Mphuthi. Increased accuracies in the distances between Earth and the moon can assist in a variety of geophysical research, such as improved tidal predictions.

“While this is not the first LLR system to be built, all current LLR stations are located in the Northern Hemisphere, so to increase the geometry of the ranging network we need some stations in the Southern Hemisphere,” says Mphuthi. Her work in using structured light for a LLR system continues in the Structured Light Laboratory, where they hope to someday provide a means for sending orbital angular momentum to the Moon.

Quantum Computing Workshop Hosted by UKZN

A successful and well-attended quantum computing workshop was hosted on the Westville campus by the Centre for Quantum Technology and the Discipline of Computer Science. The more than 30 participants included a variety of third-year and postgraduate Computer Science and Physics students. Students were given introductory lectures on quantum computing, with a focus on the elementary principles of quantum mechanics that drive quantum computing. Participants also enthusiastically engaged in practical sessions where they learned how to program quantum computers.

Quantum computing uses quantum mechanical phenomena such as superposition and entanglement to perform computations. It is a burgeoning inter-disciplinary research field that has ample opportunities for research students and the workshop was intended to introduce students to this relatively new and exciting field. The lectures and practical sessions were facilitated by members of the Centre for Quantum Technology and a research group headed by Professor Francesco Petruccione and hosted within the School of Chemistry and Physics. Lectures and practical sessions were given by Petruccione, Dr Maria Schuld and Mr Ian Joel David.

Petruccione was very pleased with the enthusiasm of the students and said he hoped they continued to advance their knowledge in the field. He is looking forward to arranging more seminars of this nature as students are clearly interested in learning new and emerging fields such as quantum computing. Academic Leader of Computer Science Professor Serestina Viriri thanked Petruccione and the Centre for Quantum Technology for informing Computer Science students about a new and exciting technology. He hoped the workshop was the beginning of a fruitful collaboration between computer scientists and physicists at UKZN.

<http://ndabaonline.ukzn.ac.za/UkzndabaStory/Vol7-Issue56/Quantum%20Computing%20Workshop%20Hosted%20by%20UKZN/>

Dr Arno Janse van Vuuren (NMU) Best Oral Presentation at REI-20

Dr Arno Janse van Vuuren from the Centre for High Resolution Transmission Electron Microscopy (HRTEM) at Nelson Mandela University won the award for the best oral presentation at the 20th International Conference on Radiation Effects in Insulators (REI-20) held recently in Astana, Kazakhstan.

The best poster presentation was awarded to a Kazakh PhD student Anel Ibrayeva, who is part of the collaboration with the CHRTEM and the Flerov Laboratory of Nuclear Reactions (FLNR) in Russia. Dr Janse van Vuuren performed the HRTEM analyses for Ms Ibrayeva.

During the REI-20 conference, Prof Neethling, Director of the Centre for HRTEM, visited the new Nazarbayev University to deliver a Memorandum of Cooperation signed between Nelson Mandela University and Nazarbayev University. This MoC includes training of Kazakhstan scientists and students at the Centre for HRTEM as well as research collaboration.

Since the inaugural 1981 REI conference in Arco, Italy, the REI conference series, held every two years, has been the prominent international forum to present and exchange information on the latest advances and achievements in the fields of radiation effects and ion beam modification in insulating materials.

<https://news.mandela.ac.za/News/Mandela-Uni-researcher-wins-award-at-Kazakhstan-co>

South Africa welcomes the world warmly to Lindau

Twenty young scientists from South Africa attended the 69th Lindau Nobel Laureate Meeting dedicated to physics from 30 June to 5 July 2019 in Lindau, Germany. The Academy of Science of South Africa (ASSAf) represents the Department of Science and Innovation (DSI) as the South African nominating partner in the partnership which was established with the Lindau Foundation in 2015. Young scientists are nominated annually to participate in the three natural science Nobel Prize disciplines of physiology and medicine, physics and chemistry, which are run in alternate years with funding from the DSI.

The Lindau Nobel Laureate Meetings are designed to foster engagement of young scientists from all over the world to have an in-depth exchanges with Nobel Laureates. This year the natural science theme was physics and South Africa had the honour of hosting the International Day held on Monday, 1 July. Lightning flickered in the distance, reflecting off the wind-ruffled Bodensee. Bottles of South African wine and excited conversation circulated amongst groups of young scientists – mostly South African, but also Mexican, British, German, Finnish, and Australian.

Prof Himla Soodyall, ASSAf Executive Officer called it the “spirit of collegiality”. “As South Africans, we have a unique ability to extend hospitality, and that is what we saw at the South African-hosted dinner on [the] Monday night,” she said. “The occasion gave us the opportunity to bring that mindset of hospitality to a global scientific event.” The dinner saw festivities as only South Africa could provide: the event started with a marimba band and Xhosa dancers, who drew members of the audience onto the dance floor, including even Prof Soodyall. Just as guests had taken their seats, South African Afro-soul singer Nomfusi had them all on their feet again, dancing to South African classics, like Pata Pata and Qongqothwane.

South Africa took the chance earlier in the day to showcase a more serious side, with a morning panel discussion of South African astronomy projects like the MeerKAT, the South African Large Telescope (SALT), and the Square Kilometre Array (SKA). The panel was chaired by Dr Beverley Damonse, Group Executive: Science Engagement and Corporate Relations at the National Research Foundation (NRF). “We spent the morning engaging with the rest of the world on global science projects like the SKA,” she says. “The global connections and the networking around that but also the skills needed for the next generation of scientists.”

“The international day was a really important opportunity for us to show the global community how seriously we take science, technology, and innovation. We need to continue to make our voice heard in these global conversations” noted Dr Damonse. DSI was represented by Mr Bheki Hadebe, Director: High End Skills who gave the dinner address and Mr Thembinkosi Magasela, Deputy Director: Emerging Researcher Programmes.

Twenty young Academy of Science South Africa (ASSAf)-nominated South African (SA) scientists were at Lindau this year. Funding for the SA young scientists was provided by the Department of Science and Innovation (DSI).

The South African young scientists were: Tariq Blecher, Rhodes University/Square Kilometre Array; Stive Djiokop, Nelson Mandela University (NMU); Jake Gordin, University of Cape Town (UCT); Thandi Gumede, Central University of Technology; Justin Harrisson, University of Pretoria (UP); Julia Healy, UCT/South African Radio Astronomy Observatory (SARAO); Jan Louw, Stellenbosch University; Genevève Marx, NMU; Itumeleng Monageng, UCT/ South African Astronomical Observatory; Francis Otieno, University of the Witwatersrand (Wits); Valentine Saasa, UP/Council for Scientific and Industrial Research; Michael Sarkis, Wits; Hester Schutte, North-West University (NWU); Katekani Shingange, University of the Free State ; Sinenhlanhla Sikhosana, University of KwaZulu-Natal; Kimeel Sooknunan, UCT; Tanita Ramburuth-Hurt, Wits; Johannes Thiersen, NWU; Nicole Thomas, University of the Western Cape/ SARAO; Danielle Venter, NMU.

<http://www.assaf.co.za/newsletter/?p=2398>

8th SA Conference on Photonic Materials (6-10 May 2019)

The 8th SA Conference on Photonic Materials took place from 6 – 10 May, 2019 at the Kariega Game Reserve in the Eastern Cape. The Organising Committee consisted of members of staff and students from the University of Pretoria, NMU and the University of the Free State, under the very able guidance of Prof Andre Venter (NMU) as Chairman. Reviewed articles from the Conference will be published in Physica B.

<http://events.saip.org.za/conferenceDisplay.py?confId=146>

Physics worth more to EU economy than retail and financial services, says study

Report commissioned by the European Physical Society says industries that rely on expertise in physics contribute 12 per cent of EU economic output

Industries that rely on physics expertise contribute more to the EU economy than financial services or retail, according to a new study. A report commissioned by the European Physical Society (EPS) says that in the EU, physics made a net contribution to the economy of at least €1.45 trillion per year – or 12 per cent – which is more than retail (4.5 per cent), construction (5.3 per cent) or financial services (5.3 per cent). Physics-based industries, it says, include electrical, civil and mechanical engineering, as well as computing and other industries reliant on physics research.

The EPS paper comes as EU countries debate how much to spend on Horizon Europe, the EU’s next research programme, which will pump billions into scientific research and technological development. The European Commission wants to spend €94.1 billion on Horizon Europe and the European Parliament wants €120 billion, but some member states, particularly Germany, say the Commission’s proposal for the entire EU budget is too big – meaning Horizon Europe could end up much smaller than scientists had hoped.

Given the likely budget crunch, various constituencies in the EU R&D world have been making the case for the value of their sectors. In its Horizon Europe proposal, the Commission hasn’t projected spending by scientific sector – but it has proposed 52 per cent of the budget go to high-profile policy challenges such as climate change, quantum computing and manufacturing competitiveness, which would draw at least to some extent on physics research.

More information: <https://sciencebusiness.net/physics-worth-more-eu-economy-retail-and-financial-services-says-study>

Ways to boot out bias

Six male researchers reveal how they are working to tackle gender inequity in the lab.

Last year, six female scientists discussed in *Nature* how they dealt with gender bias in the workplace. Several readers asked what men were doing to help. Here, six male researchers describe their efforts to support their female colleagues. Some were uncomfortable getting credit for work that they feel everyone should be doing, with one rejecting credit completely by requesting anonymity.

Read the complete article at: <https://doi.org/10.1038/d41586-019-00683-z>

Published in *Nature* **566**, 567-569 (2019)

Opportunities

Optics in Africa Publications Opportunity

There is a joint special issue of two journals of the Optical Society of America, JOSA A and JOSA B, which will feature "Optics in Africa". Guest editors are: Andrew Forbes (South Africa), Rim Cherif (Tunisia), Angela Dudley (South Africa), Ahmadou Wague (Senegal) and Alain Dikande (Cameroon).

Call information:

https://www.osapublishing.org/josaa/journal/josaa/feature_announce/oa.cfm

Submissions open: 15 March 2020

Submission deadline: 1 May 2020

Call for Proposals: African Laser Centre 2020 Training Program

The African Laser Centre (ALC) is a NEPAD flagship initiative and is funded by the Department of Science and Innovation through their Africa Multilateral Cooperation program. CSIR National Laser Centre (NLC), a key node of the ALC would like to take this opportunity to introduce the ALC training program and to invite proposals from the ALC members and other interested parties to arrange and present training related events to support the training of young researchers and/or technicians in laser related topics.

The training should be provided in line with the ALC's Educational Programme which aims are to improve and hone skills of young researches and /or technicians who are involved in laser science and technology. The Educational Programme of the ALC has three focus areas, namely

- 1) Conferences/Workshops/Symposia
- 2) Young researcher and technician training schools and
- 3) Scholarships

This call is for proposals that addresses item (1) and (2) above only. Scholarships are specifically excluded from this call.

Deadline: 14 February 2020

Please direct all queries to:

Mr Thomas du Plooy at the CSIR National Laser Centre

Tel: 012 841 3511

Cell: 082 443 1128

Email: nlcrentalpool@csir.co.za

Upcoming Conferences & Workshops

SAIP 2020 – 29 June 2020 to 3 July 2020, NWU Potchefstroom Campus

The Department of Physics of the University of North West, Potchefstroom Campus, will host the 65th Conference of the SA Institute of Physics, SAIP2020. The conference will run from 29 June – 03 July 2020. More information is available at: <http://events.saip.org.za/conferenceDisplay.py?confId=206>



The banner features a photograph of a large, white, classical-style building with a red-tiled roof and a central tower, set against a cloudy sky. A diagonal purple and teal graphic element is overlaid on the right side of the image. The text 'SAIP 2020' is in large purple letters, with 'South African Institute of Physics Conference' in smaller purple text below it. The South African Institute of Physics logo is in the top right corner. The dates and location are listed in the bottom right of the banner area.

SAIP 2020
South African Institute
of Physics Conference

SOUTH AFRICAN
INSTITUTE OF PHYSICS

29 JUNE - 3 JULY 2020 • NORTH-WEST UNIVERSITY
POTCHEFSTROOM • SOUTH AFRICA

SAVE THE DATE

20 Jan 2020	Registration and abstract submission opens
1 April 2020	Abstract submission closes
1 May 2020	Abstract Notifications to go out to abstract submitters
1 May 2020	Close of early registration
22 May 2020	Registration closes
29 June 2020	Winter School
29 June 2020	Teacher's Workshop
29 June 2020	Opening function
29 June 2020 - 3 July 2020	Conference
3 July 2020	AGM and Gala Dinner

COSFLOW2020 – 17 to 21 February 2020, STIAS, Stellenbosch

Cosmic Flows, Large Scale Structure & Visualisation (COSFLOW2020) is a conference in celebration of Prof. Renée Kraan-Korteweg that will take place from 17 to 21 February 2020 at STIAS, Stellenbosch, South Africa. More information is available at: <https://www.idia.ac.za/cosflow2020/>

The 6th biennial African School of Physics, ASP2020, 5-25 July 2020

The 6th biennial African School of Physics, ASP2020, will take place at Faculté des Sciences Semlalia, Cadi Ayyad University, Marrakesh, Morocco, on July 5-25, 2020.

ASP2020 activities:

- Students Program, July 5-24, 2020;
- High School Outreach: July 13-17, 2020;
- ASP Forum, July 22, 2020;
- High School Teachers Program, July 20-24, 2020.

The 2nd African Conference on Fundamental Physics and Applications, ACP2020, will take place on July 20-24, 2024, at Faculté des Sciences Semlalia, Cadi Ayyad University, Marrakesh, Morocco, in connection with the African School of Physics.

More information: <https://www.africanschoolofphysics.org/asp2020/>

The Third African Synchrotron Light Source Conference (AfLS3) : towards a brighter future – 16 to 21 November 2020, Kigali, Rwanda

The AfLS3 will be held in Kigali, Rwanda, from 16th - 21st November 2020. It will be hosted by International Centre for Theoretical Physics (ICTP)/East Africa Institute for fundamental research (EAIIFR), located at University of Rwanda (UR), College of Science and Technology. More information is available at: <http://events.saip.org.za/conferenceDisplay.py?confId=170>

Science for Development Workshop 2020

SAIP is partnering with the ISC Regional Office for Africa and Office for Astronomy Development (OAD) in organising an interdisciplinary workshop on Science-for-Development (<http://science4dev.astro4dev.org>). This is in line with our physics for development, and physics in industry project. EO will participate in the 2 day workshop taking place 30 – 31 Jan 2020 at SAAO.

Deadline for submissions for the March 2020 issue of Physics Comment is 28 February 2020

Physics Comment Editorial Policy

Physics Comment is an electronic magazine for the Physics community of South Africa, providing objective coverage of the activities of people and associations active in the physics arena. It also covers physics-related ideas, issues, developments and controversies, serving as a forum for discussion. It is not a peer review journal.

Physics Comment publishes innovative reports, features, news, reviews, and other material, which explore and promote the many facets of physics. Physics Comment endeavours to:

- support and inform the physics community
- promote membership of the South African Institute of Physics
- promote the understanding of physics to interested parties and the general public represent the readers' point of view
- focus on issues and topics of importance and of interest to the physics community

We accept submissions on any physics-related subject, which endeavours to inform readers and to encourage writers in their own researches. We aim to be politically, socially and geographically inclusive in the articles, which we commission and receive. Therefore, we shall not discriminate according to political or religious views. Physics Comment does not support or endorse any individual politician or political party. However, contributions, which are being published, may contain personal opinions of the authors.

It is our desire to present unfettered the opinions and research of our readers and contributors. All articles submitted for publication are subject to editorial revision. Such revisions, if necessary, will be made in cooperation with the author.

The views expressed in published articles are those of the authors and are not attributed to the Editorial

The Editor will make the final determination of the suitability of the articles for publication.

Declaration by Author

When an author submits material for publication, this means:

1. The author(s) assures the material is original, his/her own work and is not under any legal restriction for publication online (e.g., previous copyright ownership).
2. The author allows PC to edit the work for clarity, presentation, including making appropriate hypermedia links within the work.
3. The author gives PC permission to publish the work and make it accessible in the Magazine's archives indefinitely after publication.

The author may retain all other rights by requesting a copyright statement be placed on the work.

Authors should respect intellectual integrity by accrediting the author of any published work, which is being quoted.

Publication Deadlines

Physics Comment is published four times a year.

Issue	Closing Date	Publication Date
Issue 1	28 February	15 March
Issue 2	31 May	15 June
Issue 3	31 August	15 September
Issue 4	30 November	15 December

Specification and Submission of Content

Editorial Tone. As the voice of the physics community, the magazine will create a provocative, stimulating, and thoughtful dialogue with the readers; and provide a variety of perspectives that reflects the dynamism of the physics community.

Article types. The magazine is devoted to articles, reports, interesting facts, announcements and recent developments in several areas related to physics:

Manuscripts. Solicited manuscripts will be judged first for reader interest, accuracy and writing quality. The editor reserves the right to request a rewrite, reject, and/or edit for length, organization, sense, grammar, and punctuation.

Re-use. The publisher reserves the right to reuse the printed piece in full or in part in other publications.

Submission and Format. Manuscripts must be submitted to the editor on or before the designated due date. Manuscripts must be submitted electronically, on the prescribed Microsoft Word template available for download from <http://www.saip.org.za/PhysicsComment/>. Manuscripts are to be submitted directly to the editor: PhysicsComment@saip.org.za.

Style. AP style is followed for punctuation, capitalization, italics and quotations.

Photography and Illustration. All solicited photography and illustration should be part of an article and will be judged first for technical quality and editorial appropriateness. The editor and art director reserve the right to request revision or reject any material that does not meet their criteria. The publisher reserves full rights to all solicited photography and illustration, including the right to reprint or reuse graphic material in other publications.

Categories of Content Contributions

Technical articles and reports: These are generic articles of about 1 500 words plus diagrams and pictures. A technical article covers a relevant feature topic. Articles are authored by the writer and publishing a 40-word resume of the author could enhance its credibility. By submitting an article that has been previously published the author confirms that he/she has the right to do so and that all the necessary permissions have been received. The acknowledgement must be made within the article.

News: These are short editorial items usually not more than 250 words. Full-colour pictures must be clearly referenced on the editorial submission and on the picture or picture file.

Advertorials: Advertorials could be published when supplied by the client. We recommend a maximum of 500 words plus one or two pictures for maximum impact. A PDF file of the laid-out advertorial should be emailed to the client along with an MS Word file of the text and separate image files of the pictures. It is the client's responsibility to ensure that the advertorial is correct as it is, in fact, a paid for advert page.

Letters to the Editor: Letters to the Editor are encouraged. The Editor reserves the right to edit for length and format. The Editor will not change the political position of the initial letter. Physics Comment does not publish anonymous letters.

Advertising Policy: The Editorial Board will determine advertising prices for Physics Comment, subject to approval by SAIP Council. The objective will be to obtain revenue to maintain and develop the magazine. Physics Comment offers classified advertising to subscribers of the magazine for free. The advertisements must be a maximum of 60 words including the telephone number, and there is a limit of three free classifieds per subscriber, per issue. Advertisements may include a photo, which may be reduced in size or resolution by the editor to optimize loading time. All items or opportunities, which are being advertised for free, should be physics-related. The Editor reserves the right to refuse any advertising, which does not conform to the objectives of the magazine.

Submission of Articles

All articles must be submitted on the prescribed template available for download from <http://www.saip.org.za/PhysicsComment/>

