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Physics Comment

A Southern African Physics Magazine

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Editors: Professor Deena Naidoo, Dr Hellen Chuma and Dr Buyi Sondezi

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Editor's Note

The deadly monster named listeriosis is creeping in and affecting South Africans and other parts of the world. The consumption of food contaminated with the bacteria called listeria monocytogenes leads to this disease. It is believed that this disease can be prevented by basic hygiene and washing food. However, there are still several cases recorded of people infected with this disease yearly. According to the statement issued by health minister Dr Aaron Motsoaledi earlier this month, the public should avoid all processed meat products that are sold ready–to-eat as they have been found to be the source of listeriosis and the reason behind an escalated number of reported incidents recently. A fundamental understanding of listeria is essential since it is known to exist in nature and found in soil, water, vegetation and animal faeces. Dear scientists, work needs to be done to find a solution for our future generation. Using a quote from Alexey J. Merz et al., listeria motility: *Biophysics* pushes things forward, "uncertainties and gaps in the biochemical and biophysical understanding of listeria motility mean that a quantitative model for motility is far from established".

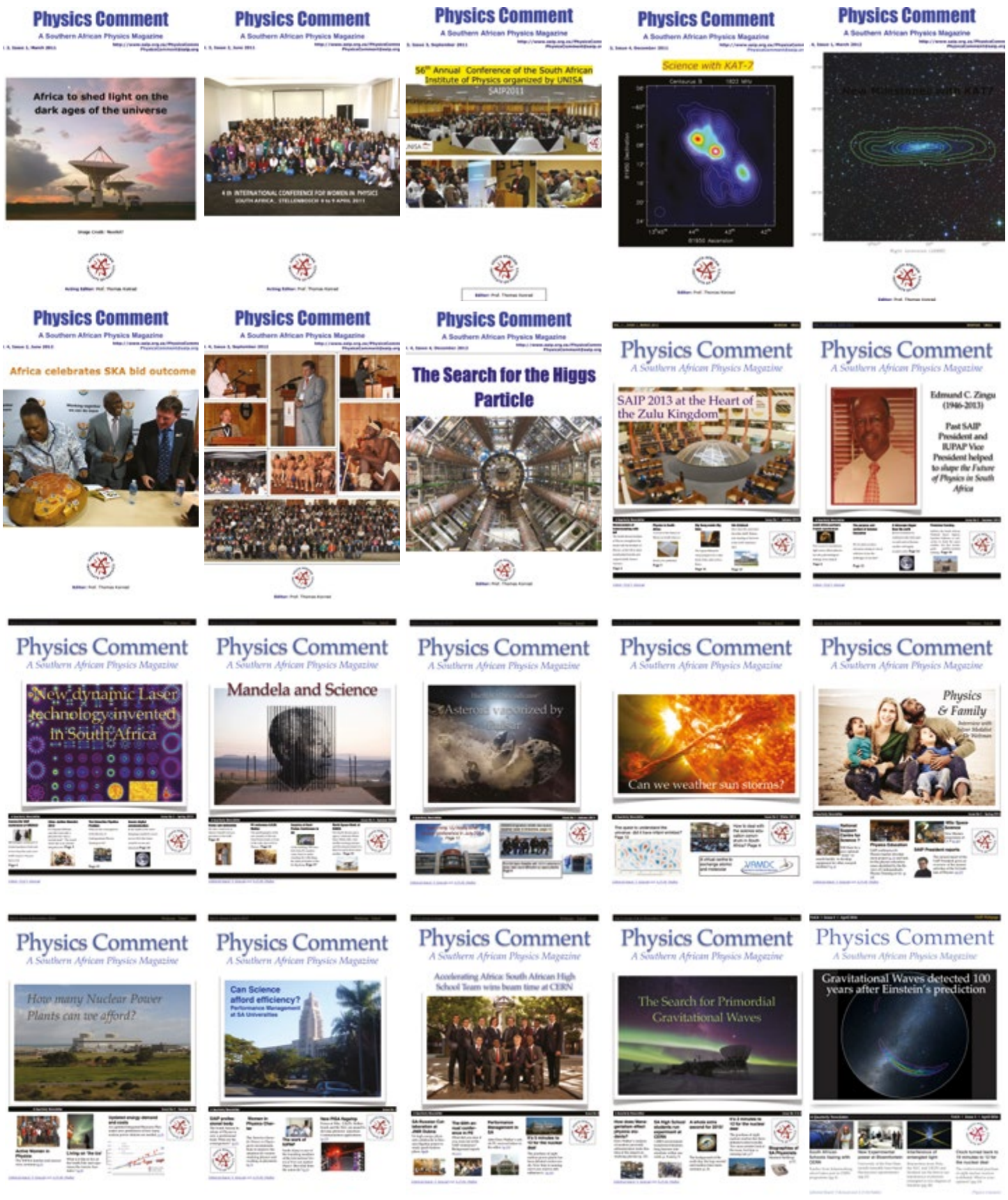
This issue of the Physics Comment is not reporting on listeriosis, but features a tribute to Professor Francis Allotey, a distinguished Physicist, articles on the LIGO/Virgo findings, PV innovation and commercialisation boost at Nelson Mandela University, Wits student involvement in the high-tech software and hardware upgrades at the CERN ATLAS detector, and news of physics meetings hosted in South Africa and abroad. In addition, we continue to keep you informed about upcoming events and opportunities available in various fields of physics.

Prof. Deena Naidoo

Dr Hellen Chuma

Dr Buyi Sondezi

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.



Physics Comment

A Southern African Physics Magazine

2011 - 2018

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

The South African Institute of Physics is guided in all of its actions by the goals and values outlined in its constitution, and the code of conduct stipulated in the by-laws. It is worth repeating these goals as stated in the SAIP constitution, namely 1) to promote and recognise excellence in Physics in all its forms, 2) to encourage greater collaboration amongst physicists, and 3) to enhance public awareness of issues relating to Physics and (to enhance) a positive image of physicists.

In pursuing these goals our activities are founded on the following values: excellence, transparency, responsiveness, relevance, participation, ethics and to be intellectually free.

At its 2016 Annual General Meeting(AGM), the SAIP Council was asked by one of its members if the University of Johannesburg (UJ) was reintroducing apartheid by splitting physics into a pure and applied physics streams, and was asked why the council was not interfering in this matter.

The matter was raised again by the same member at the 2017 AGM in the discussion of the 2016 AGM minutes.

This provocative comment did not arise from within UJ, and no supporting arguments were ever given to council to substantiate this claim. The members of the UJ Physics Department unanimously reject the negative comment made at the AGM, and any of the implications it carried.

SAIP has a strict policy of non-interference in internal university matters. The Council of the South African Institute of Physics has broadly consulted on this matter, and publicly dissociates itself from the comments made by its member at the 2016 and 2017 AGMs. We regret that these unfounded comments could have led to a lingering negative impression.

The SAIP respects and supports academic freedom and freedom of expression, yet we request that those expressions are respectful to the members of our community. Here we are clearly guided by our code of conduct.

The South African Institute of Physics aims to introduce a code of conduct for conferences at its next annual conference in 2018.

This is in line with international practices in the physics community, driven by the International Union of Pure and Applied Physics and the International Astronomical Union. The ambition of such a code of conduct is to create an environment at conferences conducive to professional scientific engagements and free of harassment of any kind.

Tribute to Professor Francis Allotey

It is with great sadness that the South African Institute of Physics has learned of the passing of Professor Francis Allotey, a Ghanaian mathematical physicist on 2 November 2017.

As a founder member of many international physics organisations, Professor Francis Allotey was extensively involved in the Pan African development of Physics; he was the founding president of the African Physical Society (AfPS), a member of the Abdus Salam International Centre for Theoretical Physics (ICTP) Scientific Council since 1996, a founding fellow of the African Academy of Sciences (AAS) and he served as President of African Institute of Mathematical Sciences Ghana.

Professor Francis Allotey had strong ties to the South African Institute of Physics, and the South African physics community. In the words of Professor Nithaya Chetty, a former president of the South African Institute of Physics, and current vice-president at large of the International Union of Pure and Applied Physics, Professor Francis Allotey dedicated much of his life to bringing African scientists together to talk about African challenges, and he strongly support edintra-African collaboration and cooperation. The South African Institute of Physics pays tribute to a truly remarkable and internationally renowned African physicist and mathematician.

Professor Francis Allotey will be sorely missed by all his friends and colleagues in the South African physics community.

On behalf of the South African Institute of Physics, we extend our deepest sympathies to Professor Allotey's family, friends and colleagues.

Tribute to Professor Stephen W. Hawking

Professor Stephen Hawking, the famous Cambridge University physicist passed away on Wednesday, 14 March 2018 at the age of 76. He has captured the imagination of many scientists and the public at large on his beliefs and knowledge on the origin of the universe and the nature of gravity.

He was also a renowned author who published a book in 1988 called ""A Brief History of Time: From the Big Bang to Black Holes," where most of his thoughts were documented on the cosmos.

Professor Hawking has association with South Africa and in May 2008, he attended the opening of the National Institute for Theoretical Physics (NITheP) at the Wallenberg Research Centre at Stellenbosch Institute for Advanced Studies (STIAS).

He gave "strong and enthusiastic support" for the Institute which was also graced by the Minister of Science and Technology, Mr Mosibudi Mangena.

The full article can be found at: http://stias.ac.za/news/2008/05/hawking-gives-enthusiastic-support-of-nithep/.

Prof Hendrik Geyer, Interim Director of NITheP, Professor Stephen Hawking and Minister of Science and Technology, Mr Mosibudi Mangena at the opening of NITheP, May 2008.

IAU Symposium 339 (Southern Horizons in Time Domain Astronomy)

The IAU Symposium 339 was held at the Wallenberg Centre of the Stellenbosch Institute for Advanced Studies (STIAS), from 13th to 17th November 2017. The IAU Symposium was organised and supported by the International Astronomical Union, the University of Cape Town, the South African Astronomical Observatory and the South African Institute of Physics. The symposium was attended by 125 delegates and 60 talks were presented. The summary of talks can be found here http://iaus339.ast.uct.ac.za/talks-pdf-version/

IAUS339 Delegates Group Photo.

The IAUS339 included a public talk presented by Dr Stella Kafka, Director of the American Association of Variable Star Observers (AAVSO) titled: "Citizen Astronomy in the era of large surveys" on Monday 13 November 2017 at 19:00- 20:30. Dr Kafka gave a short overview on how astronomy has benefited from citizen contributions in various projects. She also discussed how now, more than ever, citizen involvement in projects is needed to advance our knowledge and understanding of variable objects, and she also presented ways citizen astronomers can significantly participate in new collaborations, complementing data acquired from facilities such as MeerKAT and SALT, for cutting-edge science.

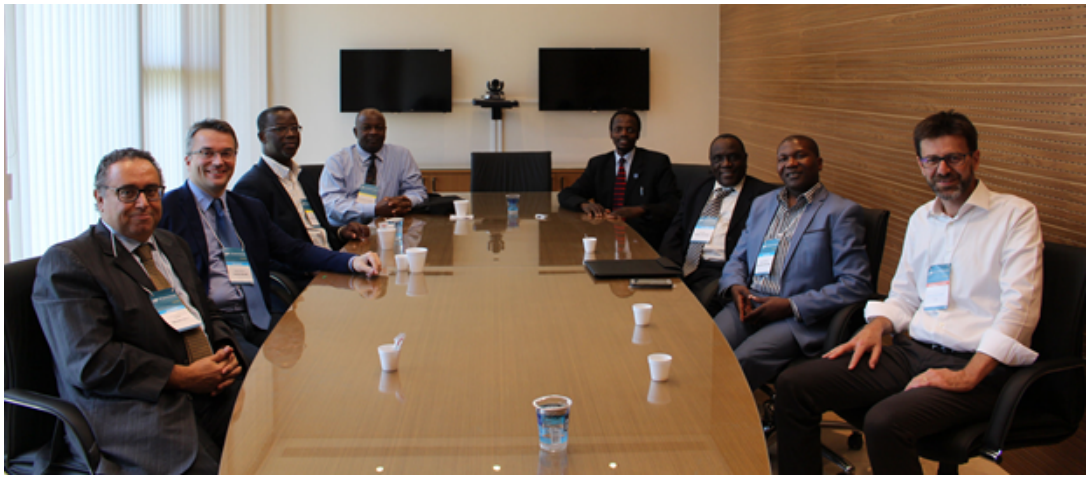
News from IUPAP: 29th General Assembly

Report by Professor Patrick Woudt: Chair Committee of the South African National Committee of IUPAP

From 11-13 October 2017, the 29th General Assembly (GA) of the International Union of Pure and Applied Physics (IUPAP) was held in Sao Paulo, Brazil. General Assemblies of IUPAP are held every three years, and provide an opportunity for representatives from IUPAP member countries to vote on resolutions of IUPAP and elect new members to commissions.

Prof Patrick Woudt and Prof Azwinndini Muronga represented the South African voting delegation at the 29th General Assembly. Dr Rudzani Nemutudi (Associate Secretary General IUPAP) and Prof Igle Gledhill (Chair of Working Group 5 of IUPAP) also attended the 29th IUPAP GA in their respective capacities of Associate Secretary General, and Chair of Working group 5, respectively.

During the GA, a lunch time meeting was arranged with the African delegates to discuss a range of topics, from the African Physics Society (AfPS), the International Centre for Theoretical Physics' (ICTP) new node in Rwanda, to South-South collaborations with Brazil. African delegates at the GA included Prof Jojo Moses Eghan (Ghana), Prof Mourad Telmini (Tunisia), Prof Akintayo Adedoyin (Botswana), Prof Amhadou Wague (Senegal), Prof Igle Gledhill, Dr Rudzani Nemutudi, Prof Azwinndini Muronga, and Prof Patrick Woudt (all South Africa).



Lunch time meeting with African delegates at the IUPAP 29th General Assembly. From left to right: Prof Mourad Telmini - Tunisia, Prof Patrick Woudt - South Africa, Prof Jojo Moses Eghan - Ghana, Prof Akintayo Adedoyin - Botswana, Dr Rudzani Nemutudi - South Africa, Prof Amhadou Wague - Senegal, Prof Azwinndini Muronga - South Africa, Dr Sandro Scandalo - ICTP.

Out of this lunch time meeting emerged the draft resolution to request that the IUPAP Council writes to the Chair of the African Union appealing for support for Basic Sciences in Africa which was later adopted as Resolution 18: Physics in Africa. The African Union target of 1% of Gross Domestic Product for the Science and Technology budget in each memberstate has not been reached, except in very few the 54 countries in Africa.

I like to draw your attention to a number of resolutions: Resolution 6 (Working Group 5, Women in Physics), Resolution 11 (The International Year of Basic Science for capital development, knowledge generation, and the building research capacities, all of which contribute to vital economic development. Expanded IUPAP membership in Africa is desirable in terms of the IUPAP mandate of fostering the worldwide development of physics, international cooperation, and the application of physics toward solving problems of concern to humanity.

The 29th General Assembly RESOLVED to mandate Council to writeto the Chair of the African Union Development), Resolution 12 (The ICSU-ISSC merger), and the earlier mentioned resolution 18 (Physics in Africa).

Commission, appealing for support for Basic Sciences in Africa, continuation of the AU effort to bring at least 1% of GDP to the budget of Science and Technology in each African state, and empowerment of Women in Science in Africa.

All the approved resolutions adopted by the 29th IUPAP General Assembly are available at: http://iupap.org/wp-content/uploads/2017/02/Resolutions-of-the-29th-General-Assembly_v2.pdf.

The 29th IUPAP General Assembly provided an opportunity for the South African delegation to connect to colleagues around the world to discuss matters relevant to Physics in Africa.

The South African delegation met with Dr Amy Flatten [Director of International Affairs, American Physical Society (APS)] and Prof Patricia McBride to talk about collaborative programs between APS and SAIP, in the light of the APS Physics in Africa project and the related survey that was conducted (see also the article in the November 2017 edition of Physics Comment).

Prof Vanderlei Bagnato (Brazil) proposed an Africa - Brazil workshop in 2018. The idea is to promote contact among the researchers in order to start cooperation, exchange of students.

Topics can be diverse and must involve physics in agriculture, health care, microbiological control and fundamental physics.

The proposal is to send three researchers (including a student) per country from Ghana, Senegal, Tunisia, Botswana and South Africa to Brazil for the workshop. Details about this workshop, and opportunities to attend this workshop will be advertised via the SAIP communication channels.

In the sidelines of the General Assembly, Nobel laureate Prof William D. Phillips gave a well-attended and fun filled public lecture on “Time, Einstein, and the coolest stuff in the Universe”. During the afternoons of the three days of the General Assembly, chairs of the working groups presented science highlights from their commissions.

Following the elections of the new members on IUPAP commissions and executive council, it is clear that South Africa is very well represented within the structures of IUPAP. An overview of South African membership of IUPAP commissions and executive council (2017-2020) is given below.

Name	**IUPAP Position**	**Email**
Dr Rudzani Nemutudi	Associate Secretary General	rudzi@tlabs.ac.za
Prof Nithaya Chetty	Vice President at Large (New Members)	Nithaya.Chetty@up.ac.za
Prof Regina Maphanga	Commission 20 - Computational Physics (Member)	rmaphanga@csir.co.za
Prof Adri Burger	Commission 4 – Astroparticle Physics (Vice-Chair)	Adri.Burger@nwu.ac.za
Prof Azwinndini Muronga	Commission 11 - Particles and Fields (Member)	Azwinndini.Muronga@mandela.ac.za
Prof Markus Bottcher	Commission 19 - Astrophysics(Member)	Markus.Bottcher@nwu.ac.za
Prof Trevor Sewell	Commission 6 - Biological Physics (Member)	trevor.sewell@uct.ac.za
Prof Deena Naidoo	Commission 14 - Physics Education (Vice-Chair)	deena.naidoo@wits.ac.za
Prof Mmanstae Diale	Commission 13 - Physics for Development (Member)	Mmantsae.Diale@up.ac.za
Prof Igle Gledhill	Working Group 5 - Women in Physics (Associate Member, Past Chair)	igle.gledhill@wits.ac.za

Please visit the IUPAP web site from more information on the commissions and working groups of IUPAP (http://iupap.org), or contact the colleagues listed above for more information about the work of the respective commissions and working groups. We will keep you informed about the activities of the various IUPAP commissions through articles in Physics Comments.

Professors Patrick Woudt and Azwinndini Muronga acknowledge financial support from the NRF through an ICSU travel grant that enabled them to attend the 29th IUPAP General Assembly.

Highlights on IUPAP activities are available in the IUPAP newsletter that can be downloaded here http://iupap.org/wp-content/uploads/2017/11/IUPAP-Dec2017-web.compressed.pdf

SAIP to launch a Physics in Industry Day at SAIP2018

SAIP is planning to launch a "Physics in Industry Workshop" at the 63rd Annual Conference of the SAIP that will be hosted by the University of the Free State, in Bloemfontein, from the 25th to the 29th of June 2018. It will be a half-day parallel session. The last workshop was a partnership between the IOP-UK, APS and ICTP and it was recommended that instead of waiting for annual conferences and workshops in South Africa, one of the options is to start a Physics in Industry Day then link it to the SAIP conference for easy organisation and logistics.

The Physics in Industry Day will be integrated with the Entrepreneurship for Physicist and scientists where SAIP wants to expose innovation to physicists in order to transfer what they are researching into products to support socio-economic development. The workshops will bring together physicists, students, scientists and industry. The physicist will have the opportunity to share their ideas that may solve challenges industry is facing while the industry can look at presentations that are ready for commercialisation. There will be local and international speakers with topics that encourage application of research in industry and motivation to create a culture of innovation in Physics.

Report by Dr Buyi Sondezi, WiPiSA Chairperson, University of Johannesburg

WiPiSA Lunches

As means of bringing together the community of Women in Physics in Institutions, it has become our culture to honour women especially during women's month, August.

WiPiSA lunches are then organised by groups to address women issues in their environments. At the end of 2017, WiPiSA supported 2 lunch activities, one from UJ and another in UNIZUL. Below is a brief report by Dr. Puleng Mbuyisa from UNIZUL.

Lunch started by introduction of all attendees, followed by discussions. A number of issues were raised including dealing with certain type of lecturers and time management. The discussions were facilitated in a manner that allowed for both academics and students to engage with each other. The academics were not portrayed as having all the answers but the advice from other students were encouraged, as senior students successfully dealt with some of the issues raised and understood the issues from students' perspective."

Pictures taken from WiPiSA lunch held in UNIZUL, September, 2017.

At the UJ WiPiSA lunch, discussions sought to answer the question, "STEM Women, do we have a challenge?" From this topic the discussion was driven in such a manner that challenges from undergraduate to postgraduate level were raised.

Resignation(s)

At the beginning of 2018, we received a formal resignation from Dr. Hellen Chuma (WiPiSA executive committee) due to enormous work commitments, family and SAIP Council. Her participation in the committee and in SAIP will always be appreciated. She worked tirelessly, and we wish her all the best in her future endeavours.

Pre-NSW Physics Engagement Programme starting SAIP2018

The current strategic focus of the SAIP is on improving the physics education pipeline. In line with this strategy, the SAIP is implementing projects such as the Review of Physics Training in South Africa, Undergraduate Physics Benchmark Statement, Physics Teacher Development, Women in Physics, Physics Olympiad, Outreach and Public Understanding of Physics, Entrepreneurship for Physicists among others.

SAIP is planning to start the Pre-National Science Week Engagement Programme at SAIP2018, to further strengthen the physics education pipeline by leveraging the SAIP Annual Conference as a vehicle for promoting science engagement annually. The overall aim of the programme is to contribute towards

building a knowledge-based economy by strengthening the Science Engineering and Technology (SET) human capital development pipeline, through stimulating interest in physics using strategies such as; physics in industry day, science educators' skills enhancement, outreach and public understanding of physics targeting the public in general, learners, educators, undergraduate students and industry.

The SAIP will leverage its large footprint; the SAIP has membership in most research and academic institutions across South Africa, in addition, the SAIP annual conference is attended by an average of 450 physicists annually. It will also include an outreach component in its annual conference and will also provide a platform for mentoring and coaching of learners. The programme will rotate throughout the country to those regions where the SAIP annual conference will be held.

Target Beneficiaries:

- The public, which needs to understand how physics improves their everyday life. The public perception is important because a learner's subject choices at high school and subsequent career choices are not only influenced by how bright they are, but by the information coming from the community in which they live and interact with daily
- Previously disadvantaged communities such as rural areas, farms, and townships
- Science educators
- Primary and Secondary School Pupils
- Science Centres
- National research and science facilities which can publicise physics career and study opportunities they offer during the event
- Academics and researchers who would gain skills in science communication and how they can share their world with public
- University students, both undergraduate and postgraduate
- Policy Makers

2018 STEMI Olympiads And Competition CoP Conference

Report by Ndanga Mahani, SAIP Office

The Science, Technology, Engineering, Mathematics, and Innovation (STEMI) Olympiads and Competitions Community of Practice conference was held from 19 – 22 February 2018 at Burgers Park Hotel, Pretoria. The theme of the conference was: *"Building a culture of volunteerism and community service in "*. It was organised by the South African Agency for Science and Technology Advancement (SAASTA) on behalf of Department of Science and Technology.

The STEMI Olympiads and Competitions Community of Practice Conference is an annual conference which is dedicated to the advancement of the Science, Technology, Engineering, Mathematics, and Innovation (STEMI) Olympiads and Competitions in South Africa by creating a community of practice where best practices are identified and benchmarked. This is achieved by bringing Olympiad and Competition organisers and other industry stakeholders together to present academic and non-academic research and talks to facilitate a platform for engagement between parties.

Objectives of the conference:

- To positively contribute towards a STEMI-driven culture.
- To create a platform for collaborative problem solving.
- To act as a catalyst between people and organisations.
- To facilitate the development of tools to improve the connection between science and society.
- To assist in transforming innovative ideas and actions into benchmarked practices.

SAIP is a STEMI member. On behalf of SAIP Physics Olympiad, Mr Case Rijsdijk (South African Physics Olympiad-SAPhO Convener and SAIP Honorary Member) presented a talk titled "Moving Forward the Online Olympiads". For the past three years SAIP has been running SAPhO which is funded by SAASTA from 2016 to date. In 2018, we plan to move to an online version of the Olympiad with back up traditional paper exam for previously disadvantage schools.

Mr Issac Ramovha (Director of Science Promotion at DST) giving the Conference objective.

Mr Case Rijsdijk giving a presentation and with other presenters.

The 6th International Conference on Women in Physics (ICWIP2017)

Report by Sylvia Ledwaba, University of Limpopo

"Advocating education brings change and that change brings hope and opportunity to young women around the world." - Malala Yousafzei, Nobel Peace Laureate.

In a quest to foster the participation of Women in Physics and come up with global strategies for increasing their representation, the IUPAP Conferences series on Women in Physics, organised the 6th International Conference on Women in Physics (ICWIP) at the University of Birmingham (UK) during the period 16 – 20 July 2017. Over 200 delegates from 60 countries attended the conference. The conference is unusual in that it relies on Country Teams of limited size, selected through Physical Societies in each country. The conference is attended by teams of physicists from countries across the world, with travel grants created to help scientists attend from developing nations. The delegates include teachers, industry experts, postgraduates, researchers and professors who were co-sponsored by Institute of Physics, Universities of Birmingham, Nottingham and Warwick, EPSRC, STFC, RS, NPL.

Conference Programme

The main conference programme entailed 6 plenary talks, workshop sessions (themed: (i) Gender Studies and Intersectionality, (ii) Improving the Workplace/ Science Practice and Ethics, (iii) Professional Development and Leadership, (iv) Cultural Perception and Bias and (v) Physics/Science Education), 4 poster presentation sessions (2 minute talks given by poster authors), 2 country poster viewing sessions showing diversity within physics for different countries, 1 science poster viewing session showing delegate's physics research/women in physics in the workplace/physics education, 1 session summarising the workshops and resolutions for the IUPAP General Assembly, and optional CPD workshops (People Like Me – a new approach to engaging girls with science qualifications and careers; Unconscious Bias– exploring what unconscious bias is, its consequences for equality in the workplace, and what we can do to minimise it. There was also a "How to get published" session for PhD students or early career researchers in an attempt to help them write and publish peer-reviewed papers

Progress in South Africa

Each country presented a poster highlighting several initiatives and progress made in an attempt to grow participation of women in physics related careers and provide support for various challenges faced by women in this field. The South African country team leader, Professor Mantsae Diale (University of Pretoria) prepared a poster reporting on the progress made in South Africa, since the launch of the Women in Physics in South Africa (WiPiSA) group in 2005 (funded by the Department of Science and Technology) as part of celebrating the world year of physics. During that time, women working in physics positions in South Africa were very few, compared to the latest figures. There has also been significant improvement in the active participation of individuals on uniting to encourage women in physics in the country. The support of the South African Institute of Physics has resulted in continued funding that contributes to the increase the numbers. Women in Physics management, led by strong team of leaders, toiled for many years, focusing on attracting girls into physics. This activity was directed towards schools and undergraduate students. The report from the launch of WiPiSA highlighted a number of issues that hinder women from progressing further in physics activities. Four key values pointed out were: diversity, inclusivity, redress and quality. The proposed aims are a continuous effort to address issues such as: hindrances to growth in the field, breaking stereotypes and availability of funding.

Conference Delegates from over 60 countries worldwide at the ICWIP 2017 at University of Birmingham.

Conference Highlights

One of the highlights of the conference was the presentation of the IOP President's Medal to Professor Dame Jocelyn Bell Burnell at a special ceremony in recognition of her ground-breaking research and her distinguished ambassadorial role for physics – particularly for widening participation of Women in Physics. The conference also heard from some of the world's leading women physicists including Professor Gabriela Gonzalez, Professor Teresa Lago and UK's Professor Athene Donald. Athene gave a fascinating insight into her research career and then her "second" career as a trailblazer for gender diversity in physics. In-depth discussions were held at the various workshops each day from the 17th to the 19th July 2017.

Surprise Visit and talk by youngest recipient of the Nobel Peace prize recipient

On the final day, there was a surprise visit and talk by Malala Yousafzai (Nobel Peace Prize laureate and activist for female education). She talked about the importance of girls' education and appealed to women physicists from around the globe to spread the message of 'education for all'. As a passionate advocate for education, Malala spoke about her work and efforts to encourage and ensure opportunities in developed and developing countries for young women to enter the education system. Malala is the co-Founder of the Malala Fund, an organisation dedicated to giving all girls access to education.

Professor Igle Gledhill (Chair: IUPAP Working Group 5 (WG5)), Ms Malala Yousafzai (Nobel Peace Laureate visiting the SA poster), Dr Sylvia Ledwaba (WiPiSA Student Representative 2016 – 2018), and Professor Nicola Wilkin (University of Birmingham, Chair: ICWIP 2017 LOC).

Report on the African Regional Workshop of the ICSU-funded Gender Gap in Science Project

Report by Professor I Gledhill

AIMS, Cape Town, South Africa, 30 Nov-2 Dec. 2017 Organisers: I. Gledhill, M.-F. Roy, M.F. Ouedraogo, R.L. Ivie, D. Gondard-Cozette and R. January.

Introduction

The African Workshop of the Gender Gap project took place at the African institute of Mathematical Sciences (AIMS), Muizenberg, Cape Town, South Africa, 1-2 December 2017.

Hosts and contributors

AIMS contributed free venues (plenary and 5 breakaway), all meals for 20 people, most airport transfers, accommodation bookings, and organizational support.

The ICSU Regional Office for Africa hosted a Meet-and-Greet event on the evening of 30 November, at which the Director, Dr Daniel Nyanganyura, was able to welcome those participants who had already arrived. The Vice-Chair of the ICSU Board of South Africa, Dr Rudzani Nemutudi opened the Workshop and stayed to participate.

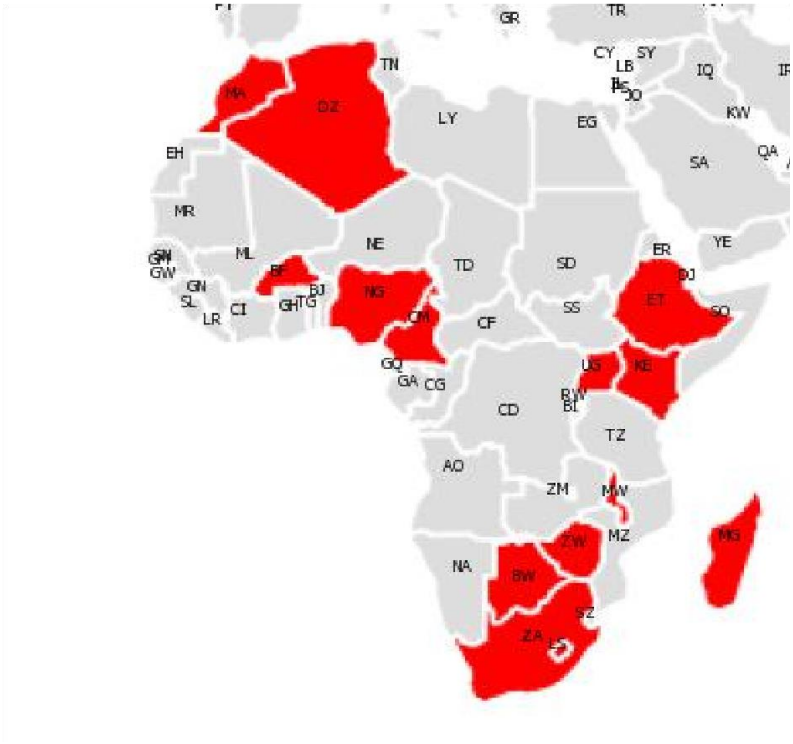
The project budget made it possible to invite all participants to dinner at the beach.

Aims of the workshop

The aims were to use our collaboration to

1. Examine the survey questionnaire to check that it addresses main issues (especially those of our region) correctly,
2. provide routes for dissemination of information about the survey in the countries and regions, and
3. collect lists of existing good practices with elaboration of lists of practices suitable for our region, and our countries.

Participants



Participants from the following countries attended:

Algeria Burkina Faso Botswana
Cameroon
Ethiopia France
Kenya Lesotho
Morocco
Madagascar
Malawi
Nigeria
South Africa
Swaziland
Uganda
United States
Zimbabwe

In total, 39 participants attended; of these, 5 were men and 34 women. The following partners were represented: IMU, IUPAP, IUPAC, IAU, IUBS, ICIAM, UNESCO and the SAGA project, OWSD, GenderInSite (by a video presentation), and ACM. In addition, SAWISE (South African Women in Science and Engineering) and WISWB (Women in Science Without Borders) were represented.

Activities

The project, the three tasks, and the survey were introduced. The workshop was unusual in that more than half of the time was spent at work in breakaway sessions. There were 6 consecutive breakaway sessions, 5 on the survey, and one on task 3 (Database of good practice). The groups were small – about 7 people – and worked very well together on specific tasks, giving short report backs, with details provided on paper and in presentations.

As Survey leader, Rachel Ivie led the Joint Global Survey working groups. Danielle Gondard-Cozette, introduced task 3, which is in early stages.

Of the 11 partners, 8 made very short presentations on their Union or organization and its involvement in the project. The participants were, in many cases, very senior scientists, and the quality of the interaction was very high.

Output

All breakaway groups recorded both detailed comments, and short presentations. These have been handed to Rachel Ivie and Danielle Gondard-Cozette as the primary facilitators. Presentations, questionnaire and reports will be made available on the wiki.

Additional activities

A few of the participants were invited to interact with AIMS women students at a mentoring lunch.

Evaluation

Evaluation forms were distributed to all the participants, and 23 were returned. Of these 20 replied that they agreed or strongly agreed that they learned about the Gender Gap project. In terms of the first aim, 22 participants were very positive that they had been able to contribute to the draft questionnaire. They were also asked their opinion on whether the results of the questionnaire would bring concrete recommendations for policies; 16 agreed or strongly agreed, 4 disagreed and 3 replied "OK".

The feedback was judged to be of a high quality and useful for future planning.

Professor Azwinndini Muronga Opinion Piece in Advancing Education Especially in Rural Areas

Two newspaper articles below are written by Professor Azwinndini Muronga who is a council member /immediate past president of SAIP and executive Dean of Science at the Nelson Mandela University. The first article was published by The Star and the second one by the Cape Times both dated the 9th of January 2018.

In the two newspaper articles, he emphasized that "Far more can excel in maths and science" and that "Maths and Physics initiatives crucial to unlocking the potential of pupils".

THEY DID IT: Final-year BSc and maths and physics postgraduate students on the National Institute of Theoretical Physics Internship Programme last month, photographed in the New Science Building at Nelson Mandela University. Like these students, matriculants who achieve in maths and science have the opportunity to pursue undergraduate and postgraduate degrees and join the global science community.
BACK, FROM LEFT: Mphamela Enos Baloyi (University of Limpopo), Precious Mogedzi Mabidi (University of Limpopo), Sindisiwe Xhakaza (University of Johannesburg), Ndivhuwo Ndou (University of Venda)
COUCH FROM LEFT TO RIGHT: Thabani Ngcobo (University of KZN), Shiffhiwa Khorommbi (University of Limpopo), John Tshegofatso Tshipi (University of Pretoria)
FRONT: Rudzani Foster Nemusunda (University of Venda), Tsebo Kibe (University of Stellenbosch)

Far more can excel in maths, science

Vhembe schools, which are producing top matriculants, show us how, **Professor Azwinndini Muronga** writes

Publication: Cape Times (First Edition)
Date: Tuesday, January 09, 2018
Page: 9

Maths and physics initiatives critical to unlocking potential of pupils

Azwinndini Muronga

AS THE executive dean of the Faculty of Science at Nelson Mandela University in the Eastern Cape, I want to congratulate the top maths and physical science matriculants in South Africa, both from Limpopo.

Tshilidzi Bambela from Tshivhase Secondary School in the rural Vhembe district is the number one national achiever, followed by Khodani Wonderful Nemalamamgwa from Thengwe High School in Mutale.

Congratulations also to Limpopo's Anza Tshipetane from Mbilwi Secondary School in the Vhembe district, one of the overall top matriculants in the country. Vhembe District is the top performing district in Limpopo in terms of quality passes and top achievers.

According to the matric results released by the Department of Basic Education, Limpopo has the highest number of top national achievers (five), featured eight times across various categories, followed by the Eastern Cape, KwaZulu-Natal, Gauteng and the Western Cape with three top achievers each.

Mpumalanga, the Northern Cape, North West and the Free State have one top achiever each.

Most of Limpopo's top achievers are from the Vhembe district, a poor rural area that routinely demonstrates its resilience despite its circumstances and the problems it experiences.

An example is the district's Vuwani, Vhuronga 1 circuit, where 30 schools were torched in 2016. Yet, in the 2016 matric results, Vhuronga 1 circuit emerged as the top-performing circuit in Limpopo and Vhembe as the top-performing district.

What repeatedly stands out in the matric results each year is the performance of three high schools in the Vhembe district – Mbilwi Secondary, Tshivhase Secondary and Thengwe Secondary. Their principals and teachers need to be recognised for the work they are doing.

We also need to recognise the communities in Vhembe, as they play a central role in the success of the learners, as do the Department of Education administrators in the district.

The schools in Vhembe are getting it right and we need to emulate what they are doing, throughout South Africa.

In my role as a physics researcher, maths and science teacher, immediate past president and international liaison councillor of the South African Institute of Physics, and executive dean of science, I am concerned about the state of maths and science education in South Africa.

It cannot continue along its current trajectory of poor performance. What schools like these in Limpopo demonstrate is that our learners are every bit up to outstanding achievements when given the right kind of guidance.

I know the schools well; I am from rural Limpopo and have worked with them. In a one-week science festival in Vhembe District, my faculty visited all three schools last year. Nelson Mandela opened a block of classes at Tshivhase Secondary. The schools are achieving up to 100% pass rates in maths and science – quality passes with distinctions, which is what we want in all provinces.

This is one of the key reasons I took up my position at Nelson Mandela, driven by my vision for science in the country. I want to help change the state of maths and science education in a province like the Eastern Cape. As academics, we cannot sit back and watch our learners fail at school, fail to gain entrance to university and fail at university.

'As academics, we cannot sit back and watch our learners fail at school'

What is encouraging about the 2017 matric results is that the Eastern Cape is starting to produce top achievers, following Limpopo.

The three most under-resourced provinces, including KwaZulu-Natal, produced top quality learners, and we need to build on this. We have the plan.

Before joining Nelson Mandela University, I was the founder and director of the University of Johannesburg Soweto Science Centre, where I was based from 2010 to 2016. My team and I demonstrated that significant successes in maths and science are possible.

From 2011 we offered focused maths and science mentoring and inspiration to about 1 000 Grade 8 to 12 maths and science learners from Soweto and the surrounding areas.

Many matriculated with distinctions in maths and science, contributing to the quality of passes in Soweto and boosting Gauteng's performance by township schools and the number of university entrants.

The first cohort graduated from universities throughout South Africa in 2015. They are part of our research pipeline, joining the global community in addressing leading scientific questions, including at our own Square Kilometre Array.

At the same time, the UJ Soweto Science Centre and the SAIP also mentored and inspired learners and teachers in Limpopo, notably from the Vhembe district. Together with colleagues from the University of Venda and University of Limpopo, we engaged with their principals and teachers over several years.

We collaborated on outreach projects and sciences camps at schools in Limpopo, in Soweto and North West, attracting girl and boy learners into physics and stimulating an interest in the subject by showing them that studying physics can be fun. Physics is the basic science underpinning all sciences, engineering and technology.

While they are in school, learners are introduced to possible careers in physics, science, engineering and technology and ways to obtain funding to further their studies, including introducing them to companies that offer sponsorships, bursaries and internships.

They have also been exposed to science expos, science exhibitions and the Science Olympiad. Many of the learners have gone on to be top achievers. In 2015, a student from Mbilwi Secondary, Hamandishe Mathivha, won a silver medal in SAIP's Physics Olympiad and became the top maths and physical science matriculant in South Africa.

Last year, a student from Mbilwi Secondary, Anza Tshipetane, won the Science Olympiad and went to London to represent South Africa. As mentioned earlier, she is now one of the top overall 2017 matriculants.

Now that I am at Nelson Mandela University, our faculty's flagship Science Education, Communication, and Outreach Programme is focusing on science education from Grade R learners to undergraduate university students, with outreach programmes for learners, teachers and communities across the Eastern Cape.

This year, as part of the university's Mandela centenary celebrations, we will be visiting and hosting maths and science exhibitions, expos and the Science Olympiad throughout the province. We will be cultivating the key ethos of "it takes a village to raise a child."

SA Physics Benchmark Statement

The SA Physics Benchmark Statement is now available of the SAIP website: http://saip.org.za/images/Edited_and_checked._Benchmark_Statement_V1-3.pdf

Benchmarks are formulated by a group comprising participants who are representative of the sector, they have to take a broad approach to integrate concerns at regional and national levels. After consultation with physicists on a regional basis, a Benchmark Statement Task Team (consisting of seven members) was constituted, representing the 17 physics departments in the country. The Task Team has now completed this first version of the benchmark statement, which will be updated from time to time through consultations with the South African physics community.

It is up to each institution to formulate the precise and measurable indicators that apply to its situation in the context of various national policies, including the Higher Education Qualifications Framework, Level Indicators, and the generic Qualification Standard for the Bachelor of Science degree, as well as the respective university rules.

The statement articulates that students in physics should learn:

- how to formulate and tackle problems in physics. For example, they should learn how to identify the appropriate physical principles, how to use special and limiting cases and order-of-magnitude estimates to guide their thinking about a problem and how to present the solution, making their assumptions and approximations explicit;
- how to use mathematics to describe the physical world. They should have an understanding Page 7 Page 8 4.2. Ethical behaviour: Students should appreciate that to fabricate, falsify or misrepresent data or to commit of mathematical modelling and of the role of approximation;
- how to plan, execute and report the results of an experiment or investigation. They should be able to use appropriate methods to analyse their data and to evaluate the level of its uncertainty. They should also be able to relate any conclusions they make to current theories of the physics involved;
- to compare critically the results of model calculations with those from experiment and observation.

The Benchmark Statement further emphasise that a physics degree should enhance the following type of skills:

- ***Problem-solving skills*** - physics degree programmes involve students in solving problems with well-defined solutions. They should also gain experience in tackling open-ended problems. Students should develop their ability to formulate problems in precise terms and to identify key issues. They should develop the confidence to try different approaches in order to make progress on challenging problems;
- ***Investigative skills*** - students will have opportunities to develop their skills of independent investigation. Students will generally have experience of using textbooks and other available literature, of searching databases and the Internet, and of interacting with colleagues to derive important information;
- ***Communication skills*** - physics and the mathematics used in physics deal with unexpected ideas and difficult concepts; good communication is essential. A physics degree should develop a student's ability to listen carefully, to read demanding texts, and to present complex information in a clear and concise manner;
- ***Analytical skills*** - physics helps students appreciate the need to pay attention to detail and to develop their ability to manipulate precise and intricate ideas, to construct logical and reasoned arguments, and to use technical language correctly;
- **ICT skills** - during their studies, students will develop their computing and ICT skills in a variety of ways, including their ability to use appropriate software such as programming languages and analysis packages; and
- ***Personal skills*** - students should develop their ability to work independently, to use their initiative and to organise themselves to meet deadlines. They should gain experience of group work and be able to interact constructively. Page 9 plagiarism constitute unethical scientific behaviour. They should be objective, unbiased and truthful in all aspects of their work and recognise the limits of their knowledge.

For the detailed Benchmark Statement please visit:

http://saip.org.za/images/Edited_and_checked._Benchmark_Statement_V1-3.pdf

Congratulatory message on SA Physics Olympiad Winners for 2017 who did well in their matric

Congratulations to the SAPhO2017 winners, both Matric and SAPhO results are outstanding achievements and wishing you well for the future. It is the aim of the SAIP to try and keep track of our SAPhO winners and SAIP would be most grateful if you could let us know what your plans are, where and what you are hoping to study and finally if there is anything that the SAIP can do to assist. Unfortunately, we are not yet in a position to assist financially, but there are other ways that we might be able to.

Angus Thring (SAPhO 2017 Gold Medallist) obtained 7 distinctions in Grade 12 while Thomas Hettasch from Deutsche Internationale Schule of Pretoria attained 8 distinctions. The Bronze medallist Graham Mitchell is currently doing Grade 12 at Pretoria Boys High School.

The Proceedings of the 61th Annual Conference of the South African Institute of Physics (SAIP2016)

The Proceedings of SAIP2016, the 61st Annual Conference of the South African Institute of Physics has been published on 24 December 2017 and is available electronically at: http://events.saip.org.za/internalPage.py?pageId=10&confId=86.

The papers are ordered by SAIP Division/Forum and then alphabetically by first author surname. The PDF file of the Proceedings can be navigated from the Table of Contents by clicking on the appropriate paper title. Alt+left arrow navigates back to the previous view. All the content of the PDF file is searchable.

Citation information:
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(UCT/2016), pp. xxx - yyy. ISBN: 978-0-620-77094-1.

Note: We recommend to first save the file to your machine (with a Right-click --> Save as...) and to then open / view the saved file.
The Proceedings of SAIP2016: Complete document (44.6 MB PDF with a total of 546 pages), published 24 December 2017.
The Proceedings of SAIP2016: Frontmatter only (13.35MB PDF with a total of 17 pages), published 24 December 2017.

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/

ARTICLES

Congratulations to LIGO/Virgo Collaborations

Report by Professor Patrick Woudt

The South African Institute of Physics congratulates the LIGO and Virgo scientific collaborations on their detection of gravitational waves from two merging neutron stars. After four previous detections of gravitational waves from merging black holes, this is the first direct observation by LIGO and Virgo of a neutron star merger. In a truly global effort, thousands of physicists and astronomers using a diverse suite of ground-based and space-based telescopes across the planet successfully identified a rapidly evolving counterpart of this event. This marks the first time that a merger of two neutron stars has been observed both through the gravitational wave emission of the in-spiraling merger, and the electromagnetic radiation of material ejected in the merging process.

The SAIP notes with delight that South African physicists and astronomers are actively involved in this unique discovery. South African contributions include observations using the Southern African Large Telescope (SALT), telescopes at the South African Astronomical Observatory (SAAO), and MeerKAT/SKA South Africa. The publication that describes the planet-wide effort surrounding this discovery, numbering approximately 3000 co-authors, includes researchers from 3 national facilities (SAAO, SALT and MeerKAT/SKA South Africa) and 5 South African

universities (North-West University, University of Johannesburg, University of the Free State, University of Witwatersrand, and University of Cape Town).

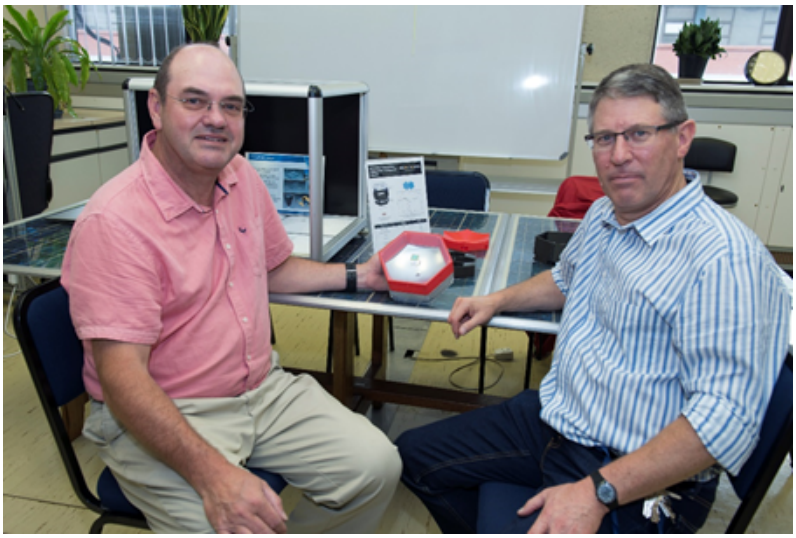
For information can be found in the SALT/SAAO press release:

http://www.saao.ac.za/press-release/salt-and-saao-telescopes-investigate-the-origin-of-the-first-detection-of-gravitational-waves-produced-by-two-colliding-neutron-stars/

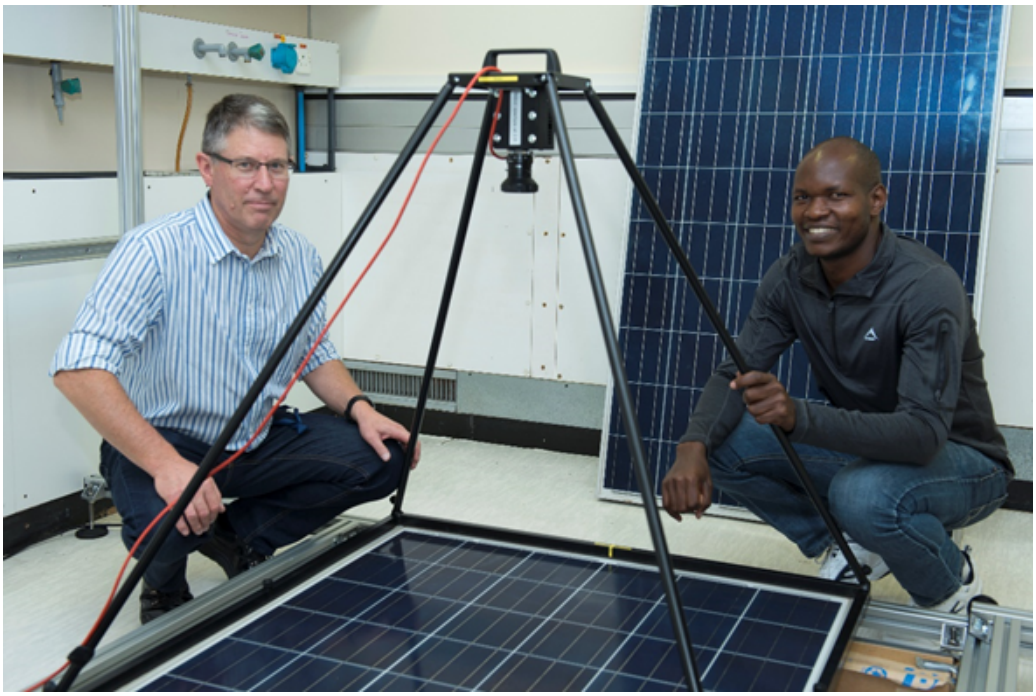
PV innovation and commercialisation boost at Nelson Mandela University

Report by Nicky Willemse (Freelance Journalist)

Pressing needs in South Africa's photovoltaics industry are what drives the research at Nelson Mandela University Photovoltaics Research Group (PVRG), which includes group leader Professor Ernest van Dyk (below right) and PV researcher Dr Freddie Vorster (holding the hybrid Concentrator Photovoltaics (CPV) cell assembly). The group has its own PV Testing Laboratory and university spin-off company, PVinsight, to enable close collaboration with industry.



Professor Ernest van Dyk and Dr Freddie Vorster.



Professor Ernest van Dyk and PhD student Isaac Kwembur inspect electroluminescence equipment used to evaluate PV modules.

Nelson Mandela University's Photovoltaics Research Group is strongly focused on conducting research that addresses industry needs – with group leader Professor Ernest van Dyk and his team shaping the PVRG into a launching pad for new innovations to meet the needs of South Africa's growing photovoltaics (PV) industry.

Through its own newly-established university spin-off company, called PVinsight (PVi) Pty Ltd, members of the PVRG also aim to serve the urgent need for standardised testing and verification in the PV industry. With many large and medium-scale commercial PV installations maturing after several years of operation in often harsh environments in South Africa, owners and operators of these systems need the assistance of expert PV laboratories to assure the long-term performance of their investments. With the university as a shareholder, the company currently operates from a laboratory on the Ocean Sciences Campus.

Responding to a strong industry demand, the PV Testing Laboratory (PVTL) has been offering testing services since 2014. The South African National Accreditation System (SANAS) awarded the laboratory ISO17025 accreditation for its five in-lab tests in February 2016, making it the second fully-accredited testing laboratory at Nelson Mandela University. "PVi is a spin-off of our fully-accredited PV Testing Lab, which has become a research and technology-testing base for industry, able to conduct laboratory and indoor tests to verify module quality, as well as on-site testing," said Professor van Dyk.

"We also create opportunities for students studying at the university in the photovoltaics field to work in the laboratory, providing them with valuable experience in an accredited environment and enabling them to gain first-hand knowledge of PV technology." In addition to the establishment of the spin-off company, the PVRG is also working on the development of Concentrator Photovoltaics (CPV). Currently, the focus of this work is on the development of a patented hybrid Concentrator Photovoltaics (CPV) technology, which is in the pre-commercialisation phase. This work is led by PV researcher and PVi technical advisor Dr Freddie Vorster – and has been the subject of four MSc and two PhD projects.

"CPV technology has the potential to lower the cost of PV-derived electricity production by focusing sunligh tonto very high-efficiency small PV cells," said Dr Vorster. "The unique feature of this patented module design is that it allows direct as well diffuse sunlight to be converted to electricity very efficiently. The modules containing the small PV cells resemble a honeycomb structure when they are grouped together and can be configured and sized according to the needs of the consumer, which is another unique feature." The late stages of this work were funded by a Technology Innovation Agency (TIA) Seed Fund Grant, through the university's Innovation Office. "We are looking at commercialising this technology, sourcing components locally. This will make the hybrid CPV technology a highly competitive energy source," said Dr Vorster. "As physicists, we've got to think in an entrepreneurial way. I encourage my students to always be thinking about how they can turn a research outcome into a business opportunity, getting engineers and business partners involved to make it real." For more information, go to: www.pvinsight.co.za.

Wits students contribute to the upgrade of the high-tech software and hardware at the CERN ATLAS detector

Report by Professor Bruce Mellado, University of the Witwatersrand

In 2012, the world was astonished by the announcement of the discovery of the Higgs boson at the Centre for Nuclear Research (CERN) in Switzerland. That announcement completed physicists understanding of what we know of the part of our world that we can see and feel, namely normal matter.

The discovery of the Higgs boson, however, inspired the worlds' physicists into a whole new world of study, searching for the answers to the mysteries of the things in our universe that we cannot see. "Normal matter, in other words, the things that we can see and feel around us comprises only about 4% of what is actually in the universe.

While we know that there is a lot of matter and energy out there we do not really know what it is and how it is related to the known matter." says Professor Bruce Mellado, the National Contact Physicist of South Africa at the ATLAS experiment at CERN from the School of Physics at the University of the Witwatersrand.

The Department of Science and Technology funds the South Africa CERN (SA-CERN) consortium. This avenue is essential for South African students and researchers to access this leading global research infrastructure.

Wits is the single largest contributor from South Africa to CERN.

This includes theoreticians and experimentalists together with a group of 35 students from a wide variety of historical and financial backgrounds that are highly involved in the search for new bosons. These students from Wits University spend significant amount of time at CERN, where some of them play an active role in the upcoming upgrading of the ATLAS particle detectors that is situated in the Large Hadron Collider (LHC). The LHC will be upgraded in 2023-2024 to increase its sensitivity in order to enhance the potential for new discoveries.

"The LHC is the largest particle accelerator in the world, and it is used to accelerate two high energy

Ntabiseng Lekalakala working on electronics at CERN.

particle beams in opposite directions in a circular route, and set them on a collision course with each other," says Ntabiseng Lekalakala, a M.Sc. student from Wits University, who is now based at CERN. "By colliding the particles against each other at speeds close to the speed of light, we physically break up these particles to see what they are made of." These collisions happen at a rate of one every 25 nanoseconds (a nanosecond is one thousand-millionth of a second).

Dingane Hlakulu, a student at the Wits School of Physics, is working on the software upgrade of the detector. He completed his Masters in Physics at Wits in 2017 and has developed a keen interest in software engineering of largely distributed systems. In October 2017, he was invited to deliver a plenary presentation on the status of the detector upgrades to the Tile Calorimeter of the ATLAS experiment – which included some of the world's top physicists in High Energy Physics. "Dingane giving a plenary presentation summarising the upgrade activities of the Tile Calorimeter of the ATLAS detector was a honour to us all," says Mellado. One of the biggest challenges at the ATLAS experiment is to sift through the huge amounts of big data that the experiment delivers, and to only capture the relevant data. This is where Dingane's software update plays a crucial role.

After the upgrade, the readout electronics will need to cope with digital data with full granularity at about 40 MHz, which means the electronics will need to process data at a minimum rate of 9.6 Gigabytes per second to the off-detector readout components. This is equal to downloading three full feature-length Blueray DVDs per second. The off-detector electronics that is used to control, configure and monitor the process will be required to send data at a rate of about 4.8 Gigabytes per second. "The software is augmented to look for specific signatures from different regions of the detector in three stages/levels and discard uninteresting events in real-time." says Hlaluku. In the current configuration of the detector, data is processed, digitized and read out at 100 KHz.

The fourth annual High Energy Particle Physics (HEPP) workshop took place between January 21st to February 2nd at the Wallenberg Research Centre, Stellenbosch. Professor Alan Cornell, from Wits University and a co-chair of the workshop detector electronics that is used to has been instrumental in the growth of the field in South Africa. "It is great to see so many new students choose to do research in our field. The attendance of this year's HEPP workshop is double that of three years ago," says Cornell.

Dingane Hlakulu and Joyful Mdhluli, WITS postgraduate students involved with the LHC project.

Another Wits student who is contributing to the upgrade of the hardware for the ATLAS detector is twenty-four-year-old PhD student, Joyful Mdhluli. Mdhluli has been involved at CERN for two years.

The experience has changed her life. "I've been able to attend numerous conferences, where I've met different kinds of people from different parts of the world, and I've also learnt a lot about High Energy Physics," she says.

"I realised that High Energy Physics basically involves a lot of interesting stuff, like astronomy and dark matter." Mdhluli's research is on trying to find materials that can withstand the high levels of radiation for parts of the ATLAS detector.

"If you want to study particles beyond the standard model, you need to get efficient and accurate data, so if the materials in the detectors deteriorate over time, then that means the signals that they get over time are not reliable.

So, we are trying to make it as efficient as possible by making sure that the materials they are using will be able to last long periods and will have reliable signals coming through," she says.

Professor Elias Sideras-Haddad, Mdhluli's PhD supervisor and a member of the ATLAS experiment, is enthusiastic about training students in nuclear and radiation physics: "The ATLAS experiment operates under high levels of radiation. South Africa has excellent capabilities to understand how detector components respond to radiation. Our work with the ATLAS experiment opens a new dimension and it demonstrates that South Africa has a lot to offer," says Sideras-Haddad.

Wits' involvement at CERN has already led to actual technological innovation in South Africa, where the Cape Town-based company, Trax Interonnect built a new 16-layer electronics board specifically for the ATLAS detector upgrade.

This board was until recently the most complex printed circuit board ever produced in South Africa. "The production of the board for ATLAS was a challenge. Since then, we have improved on our own capabilities and now we are able to produce even more complex boards," says Daniel Dock, Managing Director of Trax Interconnect.

Speaking at the HEPP workshop in Stellenbosch, Mathis Wiedeking of iThemba Laboratories said that South Africa has a long-standing collaboration with CERN. "Student training and the education of our next generation scientists is a top priority and a foundation for research development. South Africa plays a visible role in this field of research and contributes quite significantly," he said.

"The SA-CERN consortium has the capacity to attract young people and get kids interested in science, and it plays a huge role in sparking their interest in science and technology among young South Africans." Mellado agrees. "Our collaboration with CERN provides us with an excellent opportunity to develop human capacity in areas of high-tech that are badly needed in South Africa, contributing to the training of a new generation of leaders. Technology transfer to South African industry is an important by-product of this interaction," says Mellado.

Science teaching and learning still a problem in some areas

Report by Dr Buyi Sondezi, University of Johannesburg

Science Promotion Strategies

In an endeavour to deal with the challenge of reduced student numbers especially at the postgraduate level, one of Dr Sondezi's strategies is to deal with the challenge from school level. It's been few years now that various approaches are used in motivating learners to choose Physical Science at high school, and ultimately science-related courses at tertiary institutions.

These programmes includes Science Learners' Conferences, Laboratory visits at the University, specifically, University of Johannesburg (UJ).

At the beginning of 2018, a visit to a specific area in KwaZulu-Natal, learners were invited for career guidance which revealed a challenge common in most rural areas. As Science careers were presented, learners raised the fact that their schools do not offer Physical Science streams which automatically closed doors to Science related career choices. The challenge raised was the lack of teachers to teach these subjects, generally regarded as national problem.

The pictures show initiatives that promote Science at the school level. The picture on the left depicts learners attending a career talk with Dr Kitessa Roro from CSIR, from one of the conferences organised for learners, held at UJ-APK Campus.

Dr Buyi Sondezi with a group of learners who attended a Career Guidance session held in Newcastle, Kwa-Zulu Natal. High school learners who attended were from the village in Banffer Farm.

MEMBERSHIP

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
- **DOWNLOAD THE Pr.Phys APPLICATION FORM HERE**

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 should qualify to be an SAIP Ordinary member before they can be registered as a professional physicist. Check the SAIP constitution regarding the criteria here SAIP Constitution.

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

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 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 will make important new contacts and forge lifelong professional relationships by getting involved in a specialist group.
3. **Save Money** - You will 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 will 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

Opportunities

2018 De Beers Gold Medal Nominations

You are invited to submit nominations for the 2018 De Beers Gold Medal. The closing date for nominations is 23h59 on Monday, 30 April 2018 and must be sent to the SAIP secretary at secretary@saip.org.za .

Please take note of the following regarding the nominations as outlined in the Bylaws of the SAIP:

- The 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.

- The award or, in exceptional cases, two awards or no award shall be conferred every second year. The award cannot be divided and only one award shall be made to any one person.

- All members shall be invited to nominate physicists for the award. The submission shall consist of a full Curriculum Vitae of the nominee, accompanied by a substantial motivation that must describe the fields of activity in Physics in which the nominee has excelled, what his/her actual contributions are and the standards by which these contributions have been measured. Nominees must have been normally resident in South Africa up to the closing date set by the Council for the receipt of nominations. 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.

Please not that previously unsuccessful nominees for the De Beers Gold Medal may be re-nominated. Contact me if you have any further queries.

Prof R Maphanga (SAIP Honorary Secretary)

Call for IUPAP C20 Young Scientist Prize in 2018

The commission on Computational Physics (C20) of IUPAP seeks nominations for its 2018 Young Scientist Prize in Computational Physics. The awards will be held at the CCP2018, which will be held at UC Davies, CA, USA, 29th July-2nd Aug 2018.

Nominations should be emailed by 30 March 2018. For more info follow the link below: http:// www.saip.org.za/…/438-c20-young-scientist-prize-in-2…

International Union of Pure and Applied Physics

To stimulate and facilitate international cooperation in physics and the worldwide development of science.

Call for Nominations

The **Commission on Computational Physics (C20) of IUPAP** seeks nominations for its

2018

Young Scientist Prize in Computational Physics

Nominees should have a maximum of 8 years of research experience following their PhD and should be the principal performer of original work of outstanding scientific quality in Computational Physics. The prize consists of 1000 euros, a medal, and a certificate. The awards will be made at the Commission's next Conference on Computational Physics (CCP2018) to be held in UC Davis, Davis, CA, USA 29th July -2nd August 2018. The winner will also be invited to present a paper at this meeting. Procedures for making a nomination are at http://phycomp.technion.ac.il/~C20/prizes.html. Nominations should be emailed to Professor David Landau (dlandau@physast.uga.edu) by

March 30, 2018.

Please direct questions to David Landau (dlandau@physast.uga.edu).

Please post this announcement at your institutes and forward it to interested organizations

DST Call for nominations for 2018 Women in Science Awards (WISA)

The Department of Science and Technology (DST) calls for nominations for the 2018 South African Women in Science Awards (WISA). The awards recognise and reward excellence by women scientists and researchers, and profile them as role models for younger women. The awards will be made to women who are South African citizens or permanent residents.
2018 Theme: Leveraging Science, Technology and Innovation to Enhance Inclusive Growth and Development. This theme is adapted from the 2018 priority theme for the 6th BRICS science technology and innovation (STI) Ministerial meeting, which will be hosted by South Africa in July 2018.

The 2018 WISA will be presented on 16 August 2018 as part of the Department's celebration of Women's Month. The due date for applications and nominations is 18 May 2018. Follow the link below for more info and how to apply http://saip.org.za/…/440-2018-woman-in-science-awards-call-…
For more information contact Mr Thembinkosi Magasela at 012 843 6338 or Thembinkosi.Magasela@dst.gov.za

Astro Lab Tutors Training at Unizulu

Astrolab is an enquiry-based lab for undergraduate students to learn project-oriented research using a remote telescope and free software. Lecturers and tutors interested in implementing the tutorial at their university receive a one-week training to learn to supervise Astrolab. This project is supported by IAU/OAD, Les Cumbres Observatory and the University of Zululand.

Closing Date: 31 March 2018.

For more information follow this link: http://saip.org.za/…/n…/opportunities/439-astro-lab-training

Formation of Tutors for

Astrolab

a hands-on project with remote telescopic observations

Astrolab is an enquiry-based lab for undergraduated students to learn project oriented research using a remote telescope and free software. Lecturers interested in implementing the tutorial at their university receive a one week training to learn supervising Astrolab.

For more information on Astrolab:
www.unizulu.ac.za/astrolabtraining/

Applicants find more information and should fill in the downloadable form on www.unizulu.ac.za/astrolab_application_form/ before March 31, 2018.

18-22 June 2018

Venue:
University of Zululand Physics and Engineering
Department 3886
KwaZulu-Natal
South Africa

Supported by

IAU OAD
International Astronomical Union | Office of Astronomy for Development

University of Zululand

LCO
Las Cumbres Observatory

63rd Annual Conference of The South African Institute of Physics

The 63rd Annual Conference of the SAIP will be hosted by the University of The Free State, Bloemfontein, from the 25th to the 29th of June 2018. For more info please visit: http://www.saip.org.za/…/other-eve…/431-saip-2018-conference

International Conference on Physics Education (ICPE) 2018

The ICPE2018 will be co-hosted by the South African Institute of Physics (SAIP) and the School of Physics, University of the Witwatersrand (WITS) jointly with The International Commission on Physics Education (C14) of the International Union of Pure and Applied Physics (IUPAP). The conference will be held at the Misty Hills Hotel and Conference Centre, Johannesburg located close to the Cradle of Humankind, a World Heritage Site and from the famous Pilanesberg National Park.

The main theme of the conference is: "Physics Education for Development: a focus on context" with 13 subthemes. The scientific program will comprise of a diverse range of international high-level presentations consisting of plenary talks, parallel oral and poster sessions, teacher workshops/symposia and sessions for Women in Physics.

IMPORTANT INFORMATION: DATES, ABSTRACT SUBMISSION AND REGISTRATION DETAILS

Abstract Submission: Open
Abstract Submission Closing Date: Wednesday, 02 May 2018
Notification of Abstract Acceptance and Presentation Type: Friday, 18 May 2018
On-line Registration: Open

For more information visit: http://events.saip.org.za/conferenceDisplay.py?confId=93

Chair: Professor Deena Naidoo

International Conference on Surfaces, Coatings and Nanostructured Materials (NANOSMAT-Africa)

The first ever African Chapter of the established "International Conference on Surfaces, Coatings and Nanostructured Materials" (NANOSMAT-Africa) will be held in Cape Town, South Africa during 19-23 November 2018.

NANOSMAT is an established name in Nanoscience and Nanotechnology conferences. NANOSMAT conferences provide a unique platform for discussing key aspects of materials-related Nanoscience and Nanotechnology. The first ever NANOSMAT conference was held in 2005 at the University of Aveiro in Portugal. Since its inception in 2005, NANOSMAT has rapidly established itself to become a leading conference in the field of nanomaterials related nanoscience and nanotechnology. The NANOSMAT conference series foster the gathering of talented and truly international people to exchange ideas, share new knowledge and technical know-how in the broad NANO fields.

Key NANOSMAT highlights include: NANOSMAT Prize, NANOSMAT Lecture, Outstanding Young Scientist Award, Young Scientist Lecture Competition, Poster Competition, Technical Workshops, Exhibition, Special Sessions, Poster Sessions, Expert discussion forums, short courses, workshops and tutorials.

Several Nobel Laureates have given plenary and keynote lectures at NANOSMAT conferences, including Professor H. W. Kroto (USA), Professor Jean Marie-Lehn (France), Professor Peter Grunberg (Germany), Professor Albert Fert (France) and Professor Andrei Geim (UK).

NANOSMAT has produced a number high quality special issues of international peer-review journals such as Applied Surface Science (Elsevier), Thin Solid Films (Elsevier), International Journal of Hydrogen Energy(Elsevier), Nanomedicine (Elsevier), International Journal of Energy Research (Wiley), Journal of Nanoscience and Nanotechnology (American Scientific Publishers), Catalysis Today (Elsevier), Journal of Materials Science (Springer),Microelectronic Engineering (Elsevier), Surface & Coatings Technology (Elsevier) etc. The guest editors of the above mentioned special issues have been members of the core NANOSMAT steering committee.

For more information visit:
http://saip.org.za/index.php/news-and-events/other-events/437-nanosmat-africa-2018

The African School of Electronic Structure Methods and Applications (ASESMA)

ASESMA is a series of schools held every two years in different sub-Saharan countries, designed to foster a collaborative network for research within Africa in the areas of computational materials science and allied disciplines, including computational chemistry and increasingly now computational biology. Participants are drawn from across the continent through a competitive process, and the lecturers and mentors are outstanding scientists from across the world including Africa.

ASESMA is sponsored for the years 2010 to 2020 by the International Union of Pure and Applied Physics (IUPAP) as a joint mission of the Commissions on Physics Development, Computational Physics, Physics Education and the Structure and Dynamics of Condensed Matter, and it is supported by the International Centre for Theoretical Physics, the National Institute for Theoretical Physics, the U.S. Liaison Committee for IUPAP, the American Physical Society and as well as a number of international organizations.

The core guiding principle is that computation makes it possible for world-class research to be done with modest investment, and it is an essential part of education for the future. The skills acquired are useful for teaching at the university level and are transferable to other disciplines. The participants are the teachers who will educate future generations of African scientists.

The focus of ASESMA is computational methods and applications of electronic structure, chosen because it is an important field that is narrow enough to build up a network for joint work and collaboration, yet broad enough to span the range from fundamental physics to applications in materials science, chemistry, biology and many other fields. In each workshop, participants learn the basic theory and computational methods with hands-on computing, and each participant is involved in a project in an area of current research that can be continued after the school. The main applications are to materials that are crucial for many areas of technology, including solar energy and the vast reserves of minerals and materials mined in Africa.

The next ASESMA school will take place 22 October to 2nd November 2018 at the Addis Ababa Science and Technology University. A conference immediately before ASESMA is planned, namely the Ethiopian Regional Workshop on Solar Energy and Energy Storage Technologies: Materials, System Design, and Applications, supported by ICTP.

The call for ASESMA has not opened yet. The application process will be administered by ICTP. In the meantime, for financial planning purposes, there is a need to estimate the number of participants from South Africa (senior doctoral students, post docs and young faculty) who are interested in attending ASESMA2018. If you are interested, please write to Prof Nithaya Chetty (nithaya.chetty@up.ac.za) to express your interest in participating, together with a brief explanation of your interest. This does not preclude the requirement that you apply formally through the ICTP when the call is made, as this will be followed by a competitive selection process.

Deadline for submissions for the June 2018 issue of Physics Comment is 31 May 2018

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/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