



DEPARTMENT OF CHEMISTRY



Chemistry Newsletter

2019

RHODES UNIVERSITY *Where leaders learn*



RHODES UNIVERSITY
Where leaders learn





Message from the HOD.

Hello again, Students, Alumni, and Friends of the Chemistry Department.

I have mixed feelings writing this. We started this newsletter shortly after I took up office as HoD, and now as I'm getting ready to hand over to a most wonderful colleague, I'm writing this part for the last time. You can read a little more about Professor Klein and our other new Professors later in the newsletter. For now, let me say that although there have been many difficult times, I believe the best years of the Department are ahead of us.

It's been a very rewarding position for me in many ways and I'm surrounded by amazing people who've made my task of representing and promoting our wonderful Department all that much easier. In the last 7 years we've tripled our research from 9 Honours students and 30 M&D in 2012, to an average of 100 currently. Many of our staff regularly feature on the Rhodes Research Report's list of top researchers and win national and international awards. Among the accolades for next year's report will include our four new professors and NRF ratings for Dr Mashazi, Prof Lobb and Prof Mack.

Our dedication to Community Engagement and to the role of Science in the community is seen through participation in many events throughout the year. A highlight for me was this year's one-hit wonder Whizz-bang show at the National SciFest that got a round of applause from an auditorium full of jaded teenage boys (perhaps because we set the stage on fire). Thank you to Vincent Smith and the postgrad volunteers for all these events – I look forward to 2020.

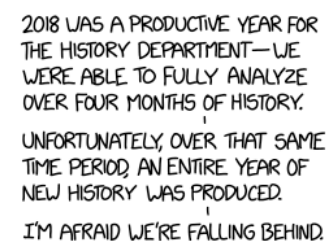
Equally, speaking of wonderful things our Department does, our team regularly thinks of ways to revitalise our undergraduate teaching through teaching workshops and symposia, curriculum changes, and new ideas. Several people have received awards in this regard, including most recently, Mrs Sewry, who deservedly took the accolade of Vice-Chancellor's Distinguished Teaching award in 2018, and presented a great lecture on Water.

Being HoD has also been a lot of work and responsibility, both of which I am happy hand on to incoming HoD, Prof Klein, but I have to say that I could not have done this job without the constant help of a very capable team. Thank-you in particular to Mrs Benita Tarr, Barbara Ah-Yui and the entire office admin team. Their wisdom has ensured we always meet deadlines, kept in constant contact with many of you, updated our social media, helped thousands of students with queries, and many, many more. I also have to take my hat off to Benita for the amazing work she's done in mentoring several admin interns over the last 7 years. These young men and women have gone on to good secure jobs with a wealth of experience under their belts. If anyone is still reading this and you want to help out, here is one place, to support our internship programmes so we can do more.

Then, my undying gratitude to the Technical staff, whose skill and ingenuity has worked miracles in installing and maintaining instruments, running labs and stores, preventing floods, and helping me out of many seeming dead-ends. I wish there were better ways to recognise and reward each of you.

Thank-you also, to colleagues for the many stimulating ideas and discussions in the tea-room and corridors and may our collaborations continue to bear such rich fruit.

Having painted this picture, we are not without our share of challenges, and I mean that in a non-



2018 WAS A PRODUCTIVE YEAR FOR THE HISTORY DEPARTMENT—WE WERE ABLE TO FULLY ANALYZE OVER FOUR MONTHS OF HISTORY. UNFORTUNATELY, OVER THAT SAME TIME PERIOD, AN ENTIRE YEAR OF NEW HISTORY WAS PRODUCED. I'M AFRAID WE'RE FALLING BEHIND.

STUDIED
NOVEMBER 1833
APRIL 19-22, 1979
MAY 21-25, 585 BCE
JUNE-AUGUST 1848
MAY 16, 2001

Cartoon c/o xkcd <https://xkcd.com/2086/>

I highly recommend Randall Munroe's new book also.

governmental sense. A few years ago, a team of people successfully lobbied for money to renovate the Chemistry building. We estimated a need of R600 million, and received around 1/5th of that. The needs have steadily risen, and in the next few years the building renovations are going to tax even the most patient of us. One positive spinoff of this reflection on buildings has been the development of the Institute for Nanotechnology, which has grown from strength to strength under the leadership of Professor Nyokong, Prof Mack, and Dr Britton. In the next few years, it is hoped to secure enough money to open a brand-new building on campus dedicated to this research.

In addition to these building needs, I mentioned how proud I was of the growth in postgrad numbers, well, that too is in jeopardy, with many applicants falling away due to lack of funds. This year alone at the start of our year, 12 applicants could not come to Rhodes due to lack of funds, and as a result we had one of the smallest Honours classes in many years. I consider this aspect a personal failure, and I would dearly like to set up an endowment fund from which we could ensure every deserving Honours applicant could be funded. If perhaps you have some spare change or influence with movers and shakers, please do contact the Department and help us fulfil this dream.

This leads me to the greatest privilege, for me at least, of being HoD - attending the many graduation ceremonies and meeting our graduates with their families. We'll no doubt celebrate more of these graduates in our next newsletter in 2020, but for now I want to thank all our wonderful students past and present for your contribution to the Department. For those students working madly to complete the year and graduate in 2020, I wish for you perseverance and success, and to those already out in the big-wide world, even more success and happiness. Please keep in contact and let us know what wonderful things you are doing.

Lastly, let me wish you all a wonderful and blessed year end and Christmas with your friends and family, and all the best for 2020.

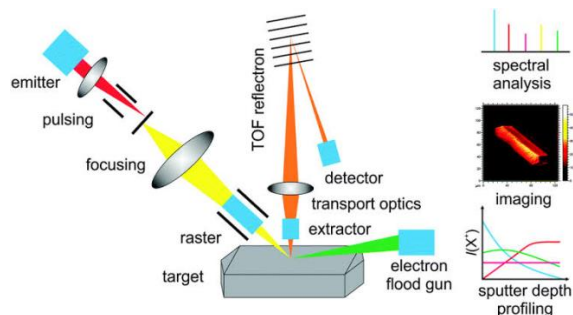
Rui Krause
Head of Department



Equipment News

TOF-Sims

Our Department is always in need of teaching and research equipment, but we have also been very privileged to get several state-of-the-art instruments. This year, Dr Mashazi (who was appointed recently as the Deputy Director of the INI), was awarded a R3 million grant from the NRF to upgrade the TOF-SIMS instrument, which is one of only two of its kind in South Africa. Contact Dr Mashazi and the INI for further details.



Time-of-Flight Secondary Ion Mass Spectrometry

(ToF-SIMS) is a surface-sensitive analytical technique that uses a pulsed ion beam to remove molecules and atoms from the very outermost surface of the sample and then analyse these using a Time-of Flight Mass Spectrometer.

Mass Spectrometry

Talking of Mass Spectrometry, during December and January, we will be relocating our newest MS instrument into a refurbished lab in the renovated BioSciences

building, and will therefore be able to offer an improved service to many of our regional and national partners. Thank-you to all the 2019 operators, Jarmo, Xavier, Judy, Sino, and Alain for their assistance in running many, many samples for clients as far away as West and Central Africa. I almost have not been able to keep up with transferring the terabytes of data to our cloud storage.

Details of the 2020 Mass spec and Nuclear Magnetic Resonance (NMR) service is being updated on our Website as you read this, and as soon as the new operators are fully trained in January we'll be on a roll.

Structure Schools

Also, for those of you who are interested, we are planning two exciting Hands-on Spectroscopy and Structure Determination Schools for early 2020, so please get in touch with Prof Krause to find out more.

















OUTSTANDING REPUTATION FOR TEACHING AND RESEARCH

The Chemistry Department at Rhodes University has earned a reputation as a leader in academic excellence in both teaching and research. The scientific knowledge and enthusiasm of Rhodes chemistry research and teaching staff has quite clearly been passed on to students. The consistently excellent results from the department are proof that the teaching environment is both disciplined and stimulating. The department celebrates an astounding total number of 106 publications in 2018, which was a combined effort between the Chemistry department and the Rhodes/DST Institute for Nanotechnology Innovation (RU/DST INI). This achievement is a testament to the department's commitment to excellence in research and is only possible thanks to our amazing graduates, dedicated admin and technical staff and guiding wisdom of the academic staff.











2019 Masters and PhD Graduates

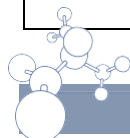
Congratulations to the following students

 <p>Muthumuni Managa PhD S22</p>	 <p>Njemuwa Nwaji PhD S22</p>	 <p>Edith Dube PhD S22</p>	 <p>Tenda Tshiwawa PhD S4</p>
 <p>Mpho Ngoepe PhD F22</p>	 <p>Gugu Msane PhD F22</p>	 <p>Yemi Oderinlo PhD F22</p>	 <p>Christian Nkanga PhD F22</p>
 <p>Siwaphiwe Peteni MSc with distinction S22</p>	 <p>Azole Sindelo MSc with distinction S22</p>	 <p>Sivu Mapukata MSc with distinction S22</p>	 <p>Nnamdi Nwahara MSc with distinction S22</p>
 <p>Nthabeleng Molupe MSc with distinction S22</p>	 <p>Nobuhle Ndebele MSc with distinction S22</p>	 <p>Sixolile Centane MSc S22</p>	 <p>Sithi Mgidlana MSc S22</p>



Best Chemistry Students for 2018

 First Year Ms P Nhau	 Second Year Mr A Tyhali	 Third year Ms T Malindi	 Conrad Cambray Award Mr B Sekaleli
 Douglas Rivett Prize Mr B Sekaleli	 South African Chemical Institute James Moir best Honours Student N Mpiti	 Best Honours Student Merck Prize C Des Fountain	 SACI James Moir Nkanga Isalomboto, Christian



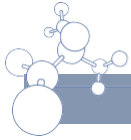
SACI Regional Seminars 2019



The ANNUAL EASTERN PROVINCE SACI POST-GRADUATE CHEMISTRY SEMINAR took place at Nelson Mandela University on Friday October 25th 2019. The four Universities in the region were represented well by their speakers, presenting on a range of research from natural product derived plasticizers to theoretical studies. It was exciting to see such a high calibre of young scientists enjoying the opportunity provided by SACI. The afternoon of talks was followed by the awarding of the SACI Post graduate award and the James Moir medals for the region.

The participants and supporters then enjoyed a short cocktail party which provided opportunity for networking and catching up amongst academics and students before the prizegiving and the long drive back to the respective cities for Walter Sisulu University (both Mthatha and East London campuses were represented), University of Fort Hare and Rhodes University. Congratulations to **Ms Sixolile Centane (PhD student, supervised by Distinguished Professor Nyokong)** for winning First Prize of the Senior Section. Ms Centane gave an oral presentation on "The electrochemical detection of a cancer biomarker on a cobalt porphyrin binuclear framework and graphene quantum dot modified electrode".

The Chemistry Department were also represented by Mr Baa Ebenezer (PhD) Talking on "Metal Organic Frameworks (MOFs)".



Eskom Expo

Students and staff from the Faculties of Science and Pharmacy, together with volunteers from town gathered together to assist with the judging of learner projects in 2019. On an earlier date two District Expos were held and some of these learners received input to help them improve for the Regional Expo. For the Regional Expo, from chemistry Mrs J. Sewry, Dr V. Smith, Dr T. Tshiwawa, Prof K. Lobb and many PhD and MSc students were busy on the day. 172 learners brought science projects to the two District Expos, and to the Regional Expo held this year. The quality of the projects was higher than in previous years with learners winning a record 14 gold, 11 silver and 24 bronze medals, together with a total of 34 merit awards. The youngest learners were in Grade 4!



Regional Expo (Photo credit: Eskom Expo)



Judges at the International science fair

Four schools deserve special mention, Victoria Girls' High School where all submitted projects received prizes, many gold, and Nkwanca High School, Nombulelo Senior Secondary School and Ntsika Senior Secondary School; for these three schools of all the projects submitted, only two for each school did not get prizes.

Later in the year two convenors from the local region, including Prof Lobb, travelled to the International Science Fair in Johannesburg to help as convenors of judges in two of the science categories.



Frank Warren Conference

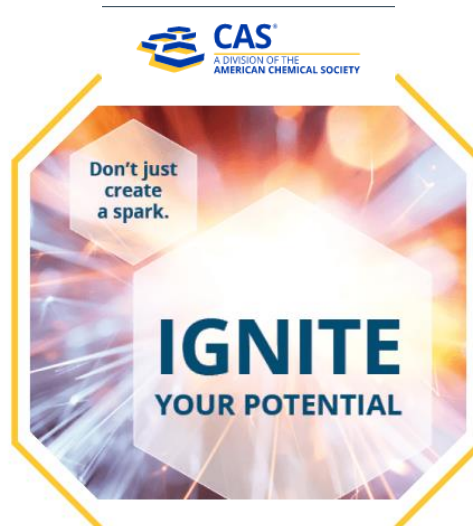
The Department was represented at the Frank Warren Organic Chemistry conference in the Drakensberg this year by members of F22 along with Profs Krause and Klein.

It was an exciting and interesting conference organized by a Rhodes alumnus, Dr Clinton Veale, and bringing together organic chemists from across the country. Among the strongest presenters were a group of academics who all trace their heritage to Professor Kaye, and remember their time at Rhodes with fondness.



Professor Klein presented a keynote lecture entitled “Green medicinal chemistry”, and alumna Moira Bode (now a Wits Professor) presented a talk honouring Professor Kaye.

Several of our students also presented posters and talks.



Apply online from 2 December

CONGRATULATIONS

Team E-Smart



Team E-Smart from Rhodes University, South Africa consisting of PhD Students (Gauta Matlou, Nobuhle Ndebele, Lindokuhle Nene and Reitumetse Nkhahle) recently won the Hult Prize Regional Summit hosted in Brookhouse international school in Nairobi, Kenya.

The 46 participating teams in the Nairobi summits (<http://www.hultprize.org/2019-summit-participants/#participants-table>) were from 16 countries including Germany, Brazil,

Kenya, Iraq, USA (Massachusetts), Jordan, London, Nigeria, Austria, Chad, Tunis and others, were Team E-Smart (representing South Africa) came out 1st (selected by a panel of 12 Judges).

Following this win, the team spent eight weeks in the United Kingdom for the Hult-Prize Acceleration program which started on the 27th of July 2019. The program aimed at preparing the 25+ winning teams from different regional summits for the final pitch competition where the best business idea will win \$1 000 000 as a start-up injection. The team plans to visit schools across the country to raise awareness about electronic waste and its dangers while inspiring young people to open their minds to the endless opportunities and works hard.



Barker Lecture 2019

The 2019 Barker Lecture was given by Professor Len Barbour a SARCHI Chair and Distinguished Professor at Stellenbosch University.

In this lecture, he described the marvellous behaviour of crystals under various conditions including light, pressure and humidity. He shared his approach to research, emphasizing the importance of observation, attention to detail, and making room for collaboration.



Industry Day 2019

The Chemistry Departments Industry Day was one to remember with companies such as Tag Solvents and Team E-Smart attending and individuals like Sue Robertson (acting Director of RU HR) presenting a short talk on making the move into industry.

On the 6 September the Chemistry Department hosted an industry day for our third year and honours students at the Continuing Education Centre. We had an interesting introduction to the CV and interview from Mrs Susan Robertson, Assistant director of HR at Rhodes, and an inspiring discussion on the state of the job market, and the journey to your dream job, led by a panel of guests including Dr Matshawe Tukulula (an alumnus and now lecturer at UKZN), Duncan Botha (Tag Solvents, Johannesburg), Remi Barnard (Anatech, Port Elizabeth). Matshawe gave us some insight into what it takes to stay in the game by sharing the story of his journey from Grahamstown to Durban, from schoolboy to lecturer. Refreshments were enjoyed afterwards along with lively discussion on what comes next as graduation loomed large in our minds.

The aim of the day was to guide our third years in how industry works and/or how a business works. We believe that some of our students do not know what opportunities their degrees hold as well as what other work they can do, whether it be by placing orders or working in admin etc. so broadening them to think wider is good.

Our first 2020 Industry Day will take place around SciFest 2020 in Mid April.



Staff News



The department of chemistry is pleased to announce the appointment of a new lecturer, Dr S. Jali. He is an inorganic chemist with a BSc and Hons (UZ), MSc (UKZN) and PhD(UKZN). His research interests are Organometallics, Homogeneous and Heterogeneous catalysis, Depolymerization of plastics to monomers, Chromatography and Nuclear Magnetic Resonance spectroscopy. His new office is F43 in the Chemical and Pharmaceutical building. He has analytical experience from the Petrochemical industry, where he was specializing in method development in chromatography and NMR spectroscopy.



Staff Development

Written by Mr Monde Mafani



I would like to thank Rhodes University for its continues support in full-filling one of it's mission towards education by supporting its staff members financially through ad-hoc funding. In 2019 I have managed to get ISO 17025(Laboratory management systems) and ISO 45001(Combined environmental and safety management systems) certification.

Written by Ms Nomvuyo Mbebe

I have been very fortunate to attend a few short courses as part of my staff development plan. I attended a Management and Supervisory Skills Course that was offered by Nelson Mandela University. The course focused on the main roles of a manager in an organisation which are planning, organising and controlling. What I learnt mostly from this course is the importance of time and priority management as a manager.



I also attended a Communication Intelligence Course offered by Rhodes University Business School. From this course I was able to identify and understand my own communication preference style from the four main communication preference styles (Style 1: Rational, Style 2: Structured, Style 3: Expressive, Style 4: Visual). This has greatly improved my communication skills as I now have insight into cultural communication background and approaches, awareness of the communication preference styles of others and an understanding of how our personal communication styles reveal themselves to others.

Hand-On Supply Chain Management Course offered by the University of Pretoria was such an awesome course to attend. The course was attended by delegates from various industries such as mining, universities, national lottery, and logistics. The practical part of the course revealed the importance of integrating the different cross-functions of an organisation in order to make sure that we have the right product, with the right quality, at the right time, at the right place for the right price. We were also able to understand how every decision we take as departmental buyers affect the overall outcomes of department in terms of achieving its goals.

Thank you to Prof G Watkins for approving the attendee of the courses, to Mr Schalk van der Merwe for providing funds, to Mrs Benita Tarr for all the travel arrangements and especially to Mr V Dondashe for always holding the fort when I am away.

25 M Manganese 54.938045	63 E Europium 151.964	63 E Europium 151.964	69 T Thulium 168.93421	10 Ne Neon 20.1797	74 W Tungsten 183.84	59 Pr Praseodymium 140.90765	8 O Oxygen 15.9994	26 Fe Iron 55.845	16 S Sulfur 32.065	16 S Sulfur 32.065	8 O Oxygen 15.9994	86 R Radon (222)	16 S Sulfur 32.065
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Rhodes University is a small community and with ~50 Associate and full Professors in the Science Faculty, it's amazing to think that 4 Chemistry academics were promoted this year to join their ranks. Congratulations to Prof Klein, Khene, Lobb, and Mack. We are also very proud to congratulate to Professor Khanye (former member of staff, now in Pharmacy), who was also recently promoted. These wonderful researchers, teachers, administrators, leaders, and much more have worked hard to meet the exacting criteria set by the personal promotions committee, and I am certain we'll see many great things from them.

I recently asked them a few questions and hope their responses give you, the reader, some insight into their wonderfulness. You can also find out more about them and their research under our newly updated webpages <https://www.ru.ac.za/chemistry/staff/academicstaff/>

First a little of their **current research interests**: Prof Khene's interests are on the Synthesis and spectroscopic characterisation of phthalocyanines and binuclear metallophthalocyanines. The others range from "The rational design of molecular dyes for applications such as photodynamic therapy, optical limiting and ion sensing" (Mack), to "Green Medicinal Chemistry, especially of new and sustainable synthetic methods" (Klein), to "Computational Chemistry related to Mechanistic aspects of Physical Organic Chemistry and Conformation problems around Drug Discovery" (Lobb).



All our new professors were nervous about the anticipated building disruptions and future of our university in general, but all of them were also **excited for 2020**. **Excited about what?**

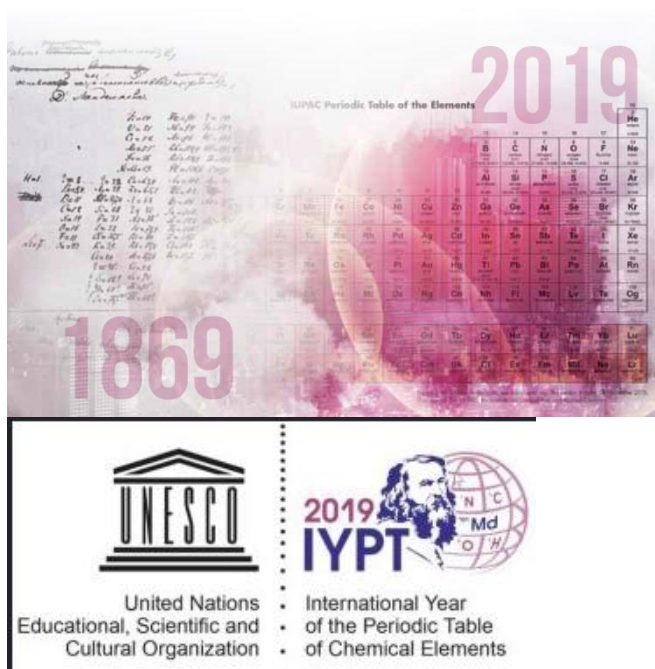


"The ongoing possibilities to carry out truly world class research with Prof. Tebello Nyokong in the Institute for Nanotechnology Innovation."

"New students and new challenges" – (Ed. You'll get lots of those as new HoD), "Exciting new projects and possibilities for world-class research", as well as a host of other aspects like - the 2nd SACI industry day, a new focus on our "Entrepreneurial Projects" for second year students, new staff member, and the opportunity to become more sustainable, use better synthetic techniques that are safe and inexpensive through a Green-Chemistry focus.

For our student readers, if you thought your new Profs were going to be easy on you, you are in for a surprise, because when I asked: "**Do you have any advice for students?**", all of them gave a similar answer. "Don't be afraid to work hard and **ask questions**. Learning is the main purpose of being at University." "You have to be willing to work hard and have the resilience to overcome unexpected problems, because there are usually no shortcuts to a successful outcome in research." "Work hard and don't underestimate the privilege of being at such a great University, but also remember to have a bit of fun" "Find work you're passionate about", "READ LOTS", "Some of the best friendships and networks are built right here." (Ed: As someone who found and married his soul mate – a Rhodes graduate, I couldn't agree more.)





As the International Year of the Periodic Table comes to an end, let us not stop being amazed by Chemistry. Tell us your favourite element and we'll include a selection in our Graduate Newsletter for 2020.

Here's some Professorial inspiration – I'll leave you to guess from who....

"Boron, since my research in recent years has increasingly focused on boron dipyrromethene (BODIPY) dyes."

"I used to say lithium because I spent my PhD working with lithium, but now ... iron? a green, abundant metal with surprising reactivity and synthetic potential."

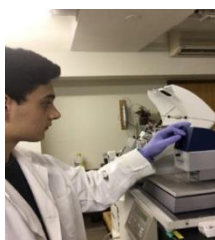


"Ethereum" – both because I'm an Anime fan, where Ethereum originated in the Ghibli films, and because even theoretical calculations can produce something useful."

"Ah!" – The element of surprise – that's what science is about – the Ah Ha moment."



JOB SHADOW

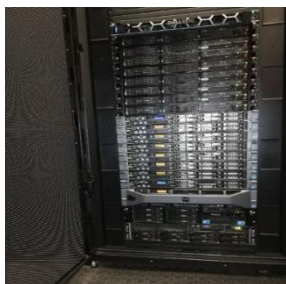


Thank you from Tariq Rouhani - Grade 11 Student

I had the opportunity to job shadow with Prof Krause and other staff members and students in the Department of Chemistry for my Grade 11 Life Orientation work shadow project. I am grateful for their time because this has been a valuable experience and a good insight into the working world.



New Equipment: Rolling Grant



With the rolling grant we received a new server which has been added to the departmental cluster for a total of 20 servers. The cluster has also been migrated to the data center which has more reliable cooling and power. This has resulted in less downtime over the past few months. Software available now includes both standard computational chemistry packages such as Gaussian, and also a range of chemoinformatics tools.



SCIFEST 2019

The Department of Chemistry was actively involved in Scifest 2019.

Workshops

Two titration and two organic functional group workshops were run for learners. These workshops, especially titrations, are popular with learners and teachers alike. As a teacher from Matatiele explained, “we can easily do the ester experiments, because they do not require expensive equipment, but we do not have the equipment for our learners to do titrations. I have one burette to demonstrate the titration to the class, but here each learner gets a chance to do their own”.



Science show

In keeping with the theme of this year's Scifest, “Choose your Element”, Prof Rui Krause and Dr Vincent Smith did two shows in the Guy Butler Theatre at the Monument. Entitled an “Extra-terrestrial Whizz through space”, Krause, Smith and postgraduate students took the audience on an exploration of chemistry in the solar system. Together they discovered alternate fuel sources, made magnificent explosions, discovered strange new planets with ‘glowing’ inhabitants and learnt about the unusual properties of gases in these extra-terrestrial environments. The students who participated talked about the experience for some time afterwards while others were left wanting to know more.



COMMUNITY ENGAGEMENT



RU Open Day

On the Friday of Scifest, the Science Faculty held its inaugural Scifest Open Day. Chemistry postgraduate students fed the learners ice-cream made with liquid nitrogen and showed them the extraordinary properties of hydrogels. According to the Dean of Science, Prof Tony Booth, "We have a captive audience on our doorstep. All these

learners have arrived in town to learn more about science. So, we need to showcase what Rhodes Science can offer and make it an attractive place for them to see themselves as science students." The open Day was a great success; some lessons have been learnt, and next year will be even better.

Now we look forward 10 May, for university-wide Open Day, to showcase the wonderful opportunities that exist in the Chemistry Department.



KHANYA MATHS AND SCIENCE



On Saturday 2 November, the Khanya Maths and Science Club arranged an outing to Kenton-on-Sea for its members. Dr Amber Childs and Bontle, a Master's student, both from the Department of Ichthyology and Fisheries Science accompanied us on the trip. They taught us about how fish and other sea creatures are adapted to living in their environments. Unfortunately

the outing coincided with the Springbok game in the Rugby World Cup final. However, all was not lost, at times we tuned in to the radio. Above is a photo of the Khanya Club members when they heard the final whistle blow.



RADIATION PROTECTION OFFICER COURSE



Gammacheck, who specialize in radiation safety hosted a Radiation Protection Officer Course in North West province. Prof. Lobb, Dr. Smith and Mr. Dondashe attended the event on behalf of the department of chemistry. The course was for 1 day. The main objective of the course was to ensure that we, as a department, are aware of all Department of Health regulations surrounding the keeping of a radioactive source (including monitoring) and also for the disposal and acquisition of new sources. The department of

chemistry now has contacts in industry able to advise on the several aspects of dealing with radioactive sources.

THANK YOU FROM CHEMISTRY STAFF



To our suppliers

We would like to express our sincere appreciation for your service in 2019. You have provided quality products and good customer services to our department. We wish you and your loved ones a happy festive season and we look forward to working with your company in 2020.

To our students

The year is coming to an end and some of you will be moving up a year and others leaving the University. We have enjoyed getting to know each of you, take what you have learnt and build on it. Thank you for everything, enjoy the festive season, hope you get lots of goodies in your stocking and we look forward to welcoming you back at graduation.

