Department of Earth Sciences

The Geode

Issue 2
April/
May 2019

The grass was greener back Then

by Dr Bjorn Von der Heyden

Among the many joys associated with the miracle of childbirth, perhaps the one that reigns supreme from the father's perspective is the license to sport a voluptuous 'dad-bod'. Or perhaps, it is the license to reminisce about one's youth that is more rewarding? The latter license may merely be an age-related thing, with the longest and most reminiscent soliloquies reserved for people of Emeritus Professor stature? Irrespective of the licensing logistics, I exercise my right as author of this column to take you, the reader, on a wondering, wandering journey down memory lane. This is an exceedingly slow journey, as the velocity is equal to zero, and we find our end destination to be right here where we began - in the *Kamer van Mynwese gebou* - except the year is 2008.

Such a decade long memory journey provides ample opportunity to retrospect and hind-see (which I can only assume is a valid verb related to the term 'hindsight'). The most glaringly obvious difference between Then and Now, is the level of inter-departmental student interaction. Of course, lives were different Then:

- Emails were checked at most once per week,
- There were no WhatsApp groups to facilitate herd mentality,
- Sedimentology 344 was still taught on an overhead projector, and
- Google had not fully risen to prominence, with the Yahoo search engine results rendering student assignments that were only half as smart.

Back Then, before all these technological advancements, departmental braais in the quad represented the place to meet, interact and learn from fellow students. These were mixed events with students from all study levels taking part. Honours and senior students were idolised by the undergraduates, and we knew each of these older students by their first name. Of course, these braais were notorious for the number of cases of personality-enhancing beverages that typically went down as fast as a labour of homes-sick moles (who knew that was the collective noun?). The roof platform became even more notorious as a place to woo future ex-potential life partners.

I guess the key message coming from this reminiscent rambling is that prior to social media, the department had a much more vibrant social scene and a much stronger culture of student interaction. This former glory can be reclaimed, but it will involve inputs, efforts, and a paradigm change from all Earth Sciences students (1st, 2nd, 3rd, and especially honours and postgraduate students). Tanisha, Tahnee and team are lauded for leading this change and each of you readers should support these efforts as much as possible. In doing so, I have no doubt that the Department will once more become the centre for extra-curricular earth science fun.

Photos provided by Bjorn Von der Heyden.

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Continuous Professional Development (CPD) and why it's important

by Tanisha Schultz

University can be a few long years of learning and the stretching of our minds, and once we get our degree, we feel rather accomplished - we are happy to move along with our professional lives. The question of how much we know in an ever-changing world of science can become tricky, and how does one go about proving that you are keeping up with progressive science?

Continuous Professional Development, or CPD, refers to the process of tracking and documenting new skills, knowledge, and experience that you gain through workshops and other informal training. CPD is important because it ensures that you continue to remain competitive within your profession, and is an ongoing process that continues through your professional career.

CPD benefits both the individual, the company, as well as the public, in the following ways:

- Ensuring that you keep up with the current standards of the industry.
- Enhancing and maintaining essential skills.
- Opening up new possibilities, knowledge, and skills.
- Ensuring that you have the relevant knowledge in ever-changing scientific trends.
- Helping you to make a meaningful contribution to your team.

In southern Africa, the South African Council for Natural Scientific Professions (SACNASP) is the governing and regulatory authority for all natural science professions. The Natural Scientific Professions Act (Act no. 27 of 2003) has made it compulsory for all practicing scientists to register, be it in academia, industry, commerce, or consulting. Qualifying CPD events are recorded by means of a credit system, over a 5-year cycle (5 credits/year). A postgraduate degree automatically awards you with 5 credits, whilst writing academic papers awards 1 - 2 credits.

The Geological Society of South Africa (GSSA) has allowed for their SACNASP registered members to record their CPD credits on the GSSA system. The GSSA has a more geoscience-specific approach, and their format changes from 5 credits a year, to 60 credits a year.

SACNASP registered GSSA members can choose to record CPD credits on either the GSSA or the SACNASP system and be mutually recognised by the other organisation. Compliance with one system will be deemed to be in compliance with the other. Although there are many elements common to both systems, the GSSA and SACNASP systems are completely different in the way they allocate credits, and it is not possible to simply transpose information/credits from one system to another.

The importance of Continuing Professional Development should not be underestimated – it is a career-long obligation for practicing professionals.

For further information regarding Continuous Professional Development, information pertaining to SACNASP registration, as well as the GSSA method of recording CPD points, follow these links:

https://www.sacnasp.org.za/overview

https://www.gssa.org.za/?page_id=454

Applicants for the 2019/2020 SU Earth Science Society Committee

The last issue of *The Geode* included an invitation to apply for the Stellenbosch University Earth Science Society (SUESS) Committee, and applications are now closed. All applicants were given equal opportunity to submit a motivation and election aim to be published. Elections will be held after an upcoming Wednesday Seminar, the date being announced via email. Voting will occur by secret ballot, with the outgoing chairperson, Liam Quinlan, acting as moderator. Here are your applicants (in no particular order) alongside their favourite mineral (if you don't know who to vote for, use this as a guide). Four of the five applicants will be chosen for the committee.

Key

Chairperson : CP
Vice-chairperson: VC
Treasurer: TR
Media & Events: M & E
Secretary: S

Tanisha Schultz

Positions applied for: M & E

Motivation:

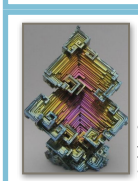
"Community is an important aspect for the development of a person, and as an academic community, we often forget this and spend time in our smaller circles. The concept of bringing people together isn't only limited to media, but includes conversation and interest. The Media & Events portfolio really tries to encompass all aspects of reaching out to students and lecturers, with the intention of creating a tight knit community, forging relationships that may last throughout their careers. For this reason, I am applying for the position of Media and Events. I believe that no one should get left behind, and that an inclusive community is necessary for all students to succeed at becoming the best earth scientist that they can be."

Francois Burger

Positions applied for: CP/VC

Motivation:

"I'm in my 3rd year studying Earth Science, the applied stream. Luckily I am very interested and passionate about what I am studying, which is sometimes not the case in the Science Department (biology students). My father is a geologist and we have lived on/near mines all my life, thus studying geology was naturally my first choice. I would like to grow the ESS and build upon the base that was already excellently broadened by the previous members. Focusing on using and adding to the resources available within the department to keep students (and hopefully lecturers) intellectually entertained and updated with events and new materials."



Michelle van der Merwe

Positions applied for: VC

Motivation:

"I'm currently doing my Honours in Applied Geochemistry. I'm passionate about sharing science with people and seeing them get excited about science too. Whether it's earth science first years, matrics, or the lady at the pharmacy who asked about my bags of sand (or the other lady who really didn't ask). I would also like to bring some more eco-friendly initiatives to the society. As well as wine glasses - the polystyrene cups situation at our braais is out of hand *badump tss.*"

Chris Rheeder

Positions applied for: Not submitted

Motivation: Not submitted

Andrea Baker

Positions applied for: VC/TR

Motivation: Not submitted

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Igneous Field Trip: Rockin' the dykelets

by Francois Burger

On Thursday, 21 March, the 3rd year Geology group had their annual Field Skills trip to the Cape Columbine Nature Reserve, in order to map part of the local Cape Granite Suite. We are, after all, studying geology in the Cape. Dr Martin Klausen, well known for his unbridled passion for igneous petrology and armed with his Leatherman, led the convoy of 3 minibuses and 2 Defenders (Dave en Wessel het *uitgestiek*) in his trusty Mitsubishi V6 *bakkie*. Student driver Francois obviously had the best taste in music, as his minibus was packed with 8 students and their luggage for the 5 day trip. Student drivers SB and Chad, on the other hand, probably blasted RSG to the 4 passengers each of them were transporting.

The Cape Columbine Nature Reserve is situated south of the sleepy town of Paternoster (not Paatrenoster, Chad). The group would camp for 4 nights at Tietiesbaai, which is a beautiful campsite on the beach. Each night between 18:00 and 21:00 the groups would be assessed individually, which provided Dr Klausen ample opportunity to ask questions, although we couldn't answer 'that's not important' or 'is that just your interpretation?'.

The first stop for the trip was Gabbro Point in Yzerfontein. Dr Klausen highlighted some spectacular layering in the exposed gabbros. The igneous lamination (in short) is the result of processes in the magma chamber where certain crystals are removed from the melt through fractional crystallisation, forming layers as they accumulate at the bottom. This is only one interpretation, as Dr Klausen would be quick to point out. A few structural measurements were taken and some sketches were drawn (for those handicapped with the 'cheap' Swedish Silva compass). By then it was around midday and the students were chastised for not packing lunch (some cement was suggested as a suitable alternative). The hardened group set off to the other 2 localities in Yzerfontein, where epidote, quartz, metal sulphide, and magnetite veins were seen in the host granite for the first time. A beautiful sill with xenoliths accumulating at its bottom was exposed on the beach, linking some textbook theory with practical experience. As our time was running out, the dykes and sills were quickly described in our notebooks and the students raced to the Weskus Mall for something to eat, other than cement.

The second day entailed the mapping of the exposed granites along the coastline of Cape Columbine, with the help of Google Earth images and a Silva compass. A few mafic dykes that had intruded into the granites were all found to have the same orientation, following along the strike of shears that were found in the area. The shears were characterised by the presence of mylonites, which are indications of ductile deformation. The granites that were found consisted mainly of two different types: a course grained alkali granite and a finer grained granite which contained more quartz and plagioclase. Anyone interested in the details of the geology can read the reports from the 22nd of April. The most spectacular feature seen in the Tietiesbaai area were the pegmatites, which have a composition identical to the host granite. The mere presence of pockets of water allowed the pegmatites to crystallise with very large crystals, containing mafic and feldspar minerals on the edges and quartz sandwiched in the middle! Interestingly, the pegmatites were found close to the contacts between the two different granites identified earlier. The Colenzo fault wasn't bad either, indicated by mylonites around 15 m in width and passing close by the campsite.

The third day was more of a geological adventure race, which included mapping large (10 m - 20 m) mesocratic rhyolite dykes at Cape St Martin. Examining cross cutting relationships between the host quartz porphyry deposits, dykes, faults and miniature "dykelets" helped the students decipher which structures formed first. By measuring the displacement along the faults, the group could estimate the magnitude of the faults. It was incredible to discover that huge amounts of information can be gained from small details and, as Nathi can testify, we also learned to ignore the red discolouration caused by the weathering of potassium feldspar.

The group hopped back into the minibuses and drove to a remote locality called Trekoskraal. The road to Trekoskraal cannot be described as minibus-friendly. Steep rocky hills down to the beach proved to be a big challenge in mom's taxi, although luckily the leading interpretation is that the cars made it through the 4x4 course unscathed. At Trekoskraal, Dr Klausen provided the challenge of deciphering the reason behind an intrusion that seemed similar to quartz porphyry, but with an igneous lamination. After many cross sections and incorrect interpretations, the concept of ignimbrites was introduced to us. Students were encouraged to think outside the box and consider all of the evidence available, as every texture and contact is a clue to what could have happened.

The next stop was Bomsgat at the SA Naval base in Saldanha. Here, a megacrystic s-type granite was the host rock, containing the Trekoskraal rock that was classified as an ignimbrite. The same igneous lamination was observed as in the ignimbrites, with a paper by Clemens *et al* (2017) explaining that it is the same rock. Essentially, welded volcanic ash spans over a large area, including the Trekoskraal and Bomsgat localities.

The fourth day was spent mapping the Cape Columbine coastline again, this time in an area closer to camp. A detailed drone image was supplied for a particularly complex area, which may have tested the relationships between team members. By this time we had become almost as passionate about our granites as Dr Klausen, and argued strongly for our interpretations. No wonder scientists often struggle romantically - some arguments can't be solved with strike and dip measurements. Dr Klausen, ecstatic that we were finally having debates about rocks, made himself comfortable on top of a giant boulder to observe the action.

The knowledge gained on this field trip is invaluable, supplementing and cementing theoretical knowledge with practical experience. Although we were often challenged on this field trip, it resulted in a greater understanding of igneous petrology. Dr Klausen's passion was definitely an asset, as we needed someone to get us into gear in the mornings. Tietiesbaai was amazing to us student geologists, because sometimes the best geologist is simply one that has seen the most rocks.

Photo provided by Bianca Oosthuizen.

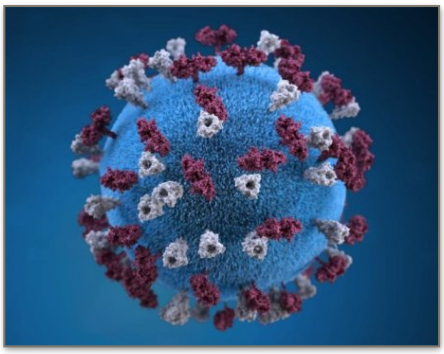
The Geode

Trending in Science

by Liam Quinlan

Vaccines and Autism

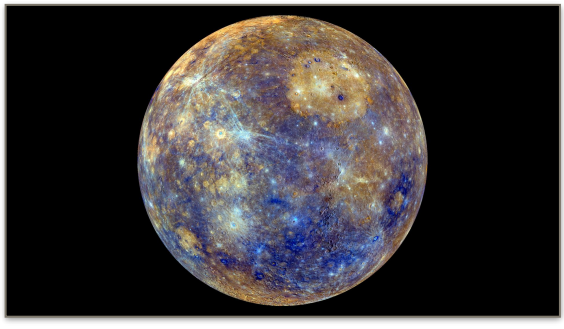
The Annals of Internal Medicine published a nationwide cohort study exploring the widespread concern of links between the MMR (measles, mumps, rubella) vaccine and autism in Denmark this year (2019). The study was conducted on 663 236 children of Danish-born mothers between 1999 and 2010, and followed up with 5 025 754 individuals that received an MMR vaccine in their first year of life (attrition due to unavailability, death, emigration, or unexplained disappearance). Of the 5 025 754 children that were studied, 6517 children were diagnosed with autism. These results were adjusted by a 'risk' score, accounting for risk factors such as unknown father, an older mother, poor Apgar score, low birthweight, preterm birth, large head, assisted birth, and smoking during pregnancy. The study further supports the results of a previous, similar study of 537 303 Danish children, finding no evidence for an association between vaccinations and autism.



Read More: https://annals.org/aim/fullarticle/2727726/measles-mumps-rubella-vaccination-autism-nationwide-cohort-study#

Hardcore Mercury

Antonio Genova, an assistant professor at Sapienza University of Rome, led the research at the NASA Goddard Space Flight reporting evidence that Mercury's inner core is solid. NASA's MESSENGER probe spent four years orbiting the planet, recording gravitational anomalies and the location of its rotational pole to better understand the orientation of the planet. Studying the small variations in a planet's spins can elucidate certain subterranean processes: the 58 Earth days spin of Mercury led the team to suggest the outer core would be liquid molten metal. The proof of the solid core came from computer-calculated analysis of the spacecraft's deliberate crash trajectory with the planet in April 2015. The team used gravity, more specifically low altitude orbit data of the crafts acceleration under gravity, to calculate the influence of the planet's density on MESSENGER's orbit. Combining geodesy, geochemistry, orbital mechanics and gravity, the theory that best explained the parameters recorded by the probes final decent is that the interior of Mercury must be solid. Estimations place the solid iron core diameter at 2000 km, accounting for half of Mercury's entire core (4000 km wide). Earth's 2400 km diameter solid core, in comparison, accounts for about a third of its entire core.



Read More: https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2018GL081135

Defence by Detection

A new way has been developed to spot near-Earth objects (NEOs) on their way to Earth. The principle investigator of NASA's asteroid hunting mission, Amy Mainzer, along with her team, is using the Earth Object Wide-field Infrared Survey Explorer (NEOWISE) telescope to find NEOs when they are far away from Earth. This is not an easy task, as NEOs are mostly small and can be very dark in colour. As an alternative, the team is using the heat from NEOs to their advantage - asteroids and comets glow brightly at infrared wavelengths. NEOWISE can spot objects regardless of their colour, and can be used to measure surface properties, such as the size of the object. The team is aiming to leverage advances in camera technology to aid in the search for NEOs, proposing a new telescope, the Near-Earth Object Camera (NEOCam), which will do a much more comprehensive job of mapping asteroid locations and measuring their sizes. Currently, there are a number of space agencies trying to understand NEOs. One of these is the Japan Aerospace Exploration Agency's (JAXA's): their Hayabusa 2's current mission is to collect samples from an asteroid.

Read more: https://www.sciencedaily.com/releases/2019/04/190417084607.htm

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Earth Sciences Library Support by Marié Theron

Wasting time with insufficient search results for your literature review? Can't access your article? Your customised Earth Science Library Guide is a one-stop easy access to your information and library resources: http://libguides.sun.ac.za/earthsciences. Access library resources off-campus from your Library Guide to ensure seamless access to databases and articles. Link your Google Scholar to our A-Z electronic journals by following the instructions from your Library Guide tag "Finding articles/databases".

Masters and PhD postgrads: do you need help with setting up alerts on your research topics? Avoid the stress of repeating literature searches with email updates of new papers added to databases following your last search.

Newly published articles are posted on Twitter to support your virtual research footprint. The paper Secondary gold mineralization in the Amani Placer Gold Deposit, Tanzania tweeted on 4 March was already viewed 355 times on twitter. Ore-shoot formation in the Main Reef Complex of the Fairview Mine—multiphase gold mineralization during regional folding, Barberton Greenstone Belt, South Africa received 208 views on Twitter since 4 March.

Contact your Science Librarian Marié Theron for assistance: theronm@sun.ac.za or Desk 2 in the Library. Please also send information of your articles to avoid missing new papers.

SciencelibSUN @siencelibSUN

The Sweethearts Foundation

by Michelle van der Merwe

In 2018, the Social Committee of the SU Genetics Department became an active member of the Sweethearts Wheelchair Foundation. This year, the Earth Science Society will join forces to help with the collection efforts.

The Sweethearts Foundation is a 100% Non-Profit Organisation that collects #TopsAndTags, recycles them, and then purchases wheelchairs for the disadvantaged members of the community. Collecting 450 kg of bottle tops or 50 kg of bread tags is the equivalent of one wheelchair - simple maths.

These day-to-day items are easy to collect: simply keep a plastic bag under your sink and when you've collected a bundle drop them off in the assigned box in the practical lab. There is also an annual collection event hosted in the Neelsie, with prizes for the biggest collectors sponsored by Mybrew. More information will follow in the second semester.

Please go like their Facebook page and start collecting!!

Earth Science jackets, headbands, water bottles

In case you missed it, it's that time of year where your Earth Science essential gear is being made. This year, you can choose between the water resistant Celsius Jacket, the Palermo soft-shell Jacket, some multi-functional headbands, as well as a trusty aluminium water bottle. To place your orders, follow the link before 8 May 2019: https://docs.google.com/forms/d/e/1FAIpQLSe8O_9tRyAPn5DB5jPZkhNfsnBblqZN7dHNbgnSC_AsY6fddQ/viewform?vc=0&c=0&w=1

Payment needs to be made by 10 May 2019 to confirm your order.Please contact Tanisha at 18191010@sun.ac.za or +27 73 462 8372 for any queries.

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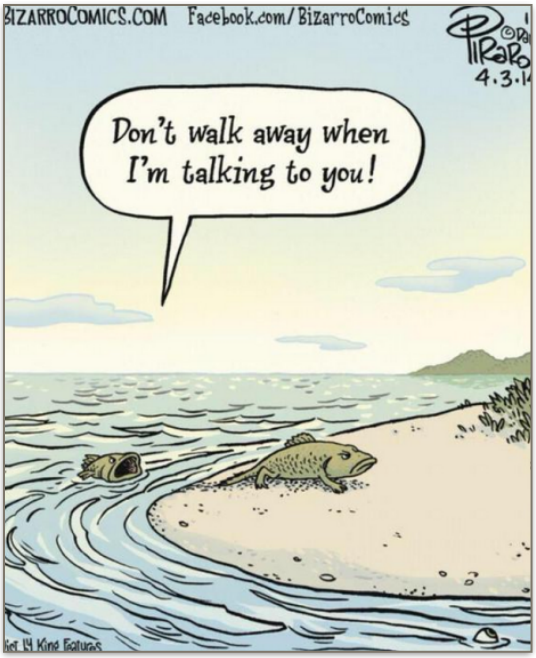
ANSWERS TO MARCH/APRIL CROSSWORD

Across:

1 Lungfish
3 Halflife
5 Intrusion
8 Radioactive Decay
11 Geological Time Scale
13 Casts
14 Ammonites
16 Paleozoic
18 Three Five Billion Years Ago
19 Pangea
21 Mass Extinction
23 Sedimentary Rock
25 Precambrian Time
26 Carbon
27 Elements
28 Mesozoic

Down:

2 Fossils
4 Four Six Billion Years
6 Law Of Superposition
7 Jawless Fish
9 Fossil Record
10 Extrusions
12 Atoms
15 Fault
17 Palontologists
18 Trace Fossils
20 Reptiles
21 Molds
22 Periods
24 Eras

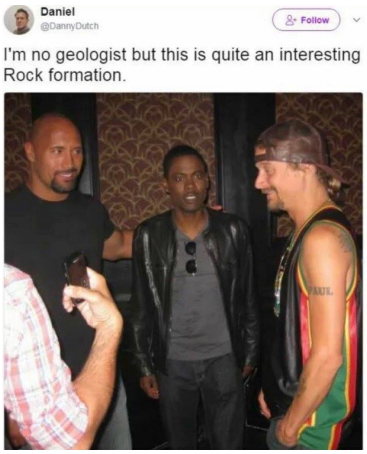


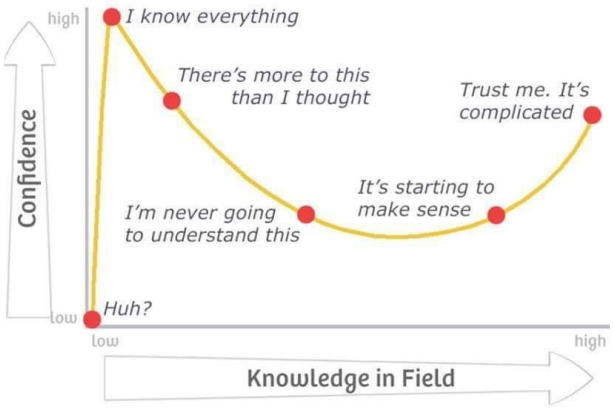
WANT TO BE INVOLVED?

If you would like to be involved in *The Geode*, email Tanisha at 18191010 @sun.ac.za or Tahnee at tahneeotto @sun.ac.za.

Anyone welcome!

Here are the six most liked memes/images on the SU Earth Science Society Facebook Page since the start of 2019:





Magma is red,
Sapphires are blue,
Don't take science for granite
That's a schist thing to do.

#ScienceValentines
#poetryisharderthancorundum

Make friends in your classes

When it's the early cretaceous period and you split from South America

GET INVOLVED!

SU EARTH SCIENCE SOCIETY
@SUEARTHSCIENCES

VOTING DAY 8 MARCH

DON'T FORGET THAT WEDNESDAY, 8 MARCH IS VOTING DAY AND A PUBLIC HOLIDAY. VOTING REGISTRATION IS CLOSED FOR 2019. THE CLOSEST VOTING STATION IN STELLENBOSCH WILL BE LOCATED AT THE STELLENBOSCH TOWN HALL IN PLEIN STREET. GO TO HTTP://MAPS.ELECTIONS.ORG.ZA/VSFINDER/ TO FIND YOUR CLOSEST VOTING STATION.

Editing and Layout: Tahnee Otto. All articles by respective Authors.