

PalNews



Biannual newsletter of the Palaeontological Society of Southern Africa February 2017



Striking the pose: From left to right, Steve Edwards, Jonah Choiniere, and Michel Zondo strike the familiar palaeontologists' pose as they look for fossils on the banks of Lake Kariba. This trip was the result of a collaboration between Wits ESI and National Museums and Monuments of Zimbabwe.

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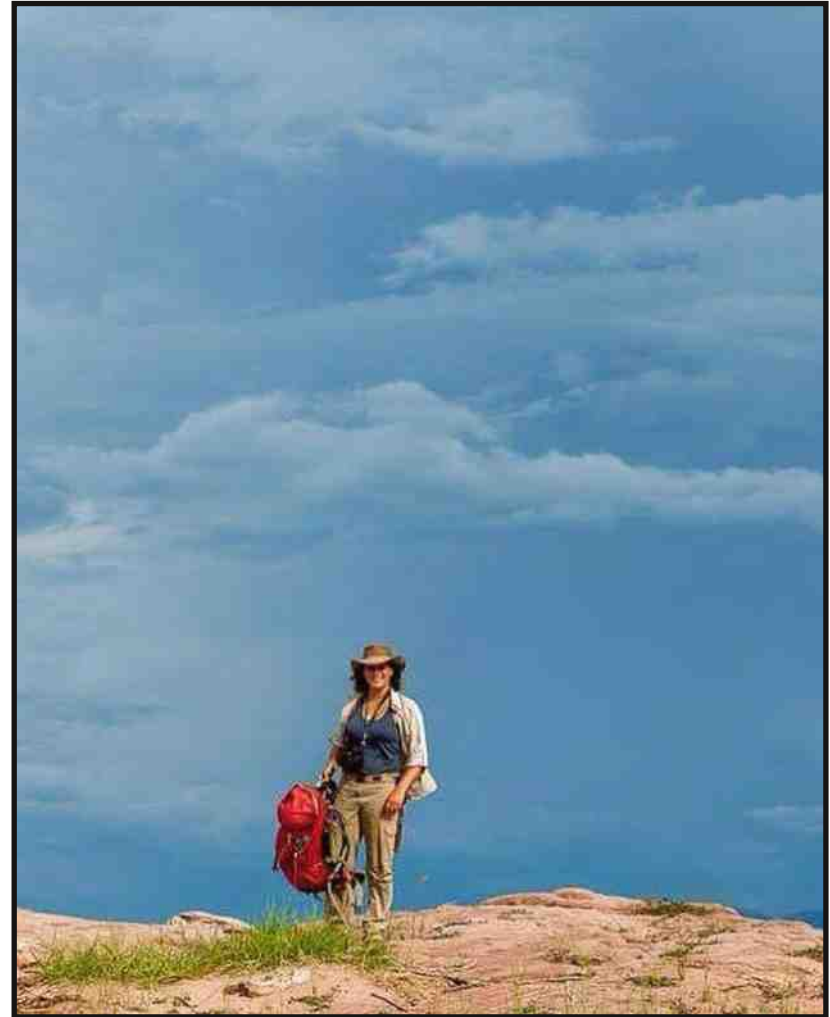
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From the Editor

The first two weeks of the year started off on quite a high for me as I took part in probably the best fieldwork experience of my life. The fieldtrip's objective was to search for fossils around the margin of Lake Kariba, and was organized in collaboration with the Evolutionary Studies Institute and National Museums and Monuments of Zimbabwe (more info on the trip in this issue). A wonderful time was had, and I think I can speak for all involved that it was hard to say goodbye to the beautiful vistas, wildlife, and fossils Kariba has to offer. Zimbabwe also clearly did not want to say goodbye to the team as our exit from the country was delayed to put it lightly. Thankfully we all got back safe and sound and could get on with the rest of the year (and finishing this issue of PalNews)!

Finally, thank you to all who have contributed to this next issue. It turned out to be a bumper issue, and appears many are up to some very exciting projects. I look forward to what lies ahead for the community in 2017. So please keep sending me your updates, and I hope you are all enjoying what I have done to the beloved PalNews.

All the very best,
Pia



Burrows and Other Goggas from the Old Karoo

By Gideon Groenewald
PO Box 2 Clarens, 9707

The Karoo Basin has seen many human beings walking with their heads bent down like chickens looking for something to eat, yet these people were not hungry for food, they were looking for rocks, very special “rocks”. Well, one day near Bethulie, a small town on the banks of the mighty Khariep River, better known as the birth place of actor and comedian Patrick Beattie Mynhardt, one of these men were walking up a hill where a farmer and his helpers were mending a fence. After greeting the farmer and getting permission to go “fossil hunting”, the slightly stooped hunter, armed with his geological pick, “slipped-walked” slowly up the “Karoo Koppie”, listening to the discussion between the farmer and his workmen. Their voices resounded in the quiet winter chill of the Karoo – “Hey Basie, wat kom staan soek die Duusman dan nou vanmôre hier innie bergie?”. Slowly, with the authority of one who knows a secret more sacred than water in the dry Karoo, the farmer answered - “Nee Gatiep, die mannetjie soek klippe!”

A long silence fell over the plains of the Bethulie landscape. A sheep bleated a lonely song into the future. In the pale blue winter sky a lone eagle turned in search of an unwitting Dassie. In the quiet, the reply of the stunned farmhand reached the ears of the Karoo Researcher – “Jirre Basie? - hier is nou so baie klippe! – wat kom loop soek die man nou wragtag dan NOG?!” The sound of the last word carried in the wind towards the Bushmen shelter at the top of the hill, where it



Image credit: Patricia Groenewald

resounded and repeated itself in an echo towards the young researcher who just came to behold the fossilized remains of a *Lystrosaurus* – buried in a burrow nearly 240 million years before the farm boy’s ancestors drew pictures on the rock faces in the valleys of the Khariep. For many of our friends who are not fluent in Afrikaans, the treasure hidden in this question, or even the question itself, might forever be a mystery? The young hunter was in fact looking for something like the rock from the James

Kitching collection at Oliviershoek Pass that ended up in France, where we suddenly saw with our own eyes that not only reptiles but also amphibians were possibly using burrows to hide or sleep in during the harsh Triassic times of the *Lystrosaurus* Assemblage Zone near Harrismith in the Free State Province of South Africa. As far as we know, vertebrate burrows have been described by some of the academic masters of the South African world of Palaeontology since the early 1980's with *Diictodon* taking honors for its helical constructions. Had these been delicate homes, or maybe "boreholes" to fetch water, or just a place to hide from the scorching Permian sun?

Helical burrows are now known from the Middleton Formation, the Abrahamskraal and Balfour (Normandien) Formations, and from many different locations in the Karoo Supergroup strata. Complex sets of casts of vertebrate burrows have been recorded from the *Cynognathus* Assemblage Zone in the Golden Gate Highlands National Park where two adults and a baby *Trirachodon* became entombed to record a sudden catastrophic event that buried them alive, together, forever. Vertebrate burrows are also known from localities in the Elliot Formation where the relatively small (10cm) scale burrows with very marked scratch marks and a pronounced "middelmannetjie" indicate that the very early mammals possibly used these ingenious architectural wonders to hide in, find food, sleep or dig all the way to the water table to find drinking water.

The burrows of the Elliot Formation are invariably filled with very fine-grained sand or loess, indicating that they did not collapse, but were most probably filled during severe dust storms that caused the catastrophic end of

many mammal lineages. Are casts of vertebrate burrows not often observed by fossil hunters because there are only a few of these structures preserved in the rock record of the Karoo Supergroup, or are there so many of them that we fall over them without noticing the richness of this treasure-trove at our feet?

Did the young farm boy at Bethulie know the answer to his question or did he simply leave the question to echo from the cliffs above him to be repeated by so many people who live and walk in the valleys of the Khariep today? The secrets of the Karoo in Southern Africa are only witnessed by those who are prepared to look beyond the boundaries of Yester Year – those of us who not only look at the many rocks around us, but are also prepared to look inside the rocks for our rich and revealing history.

(In the next issue of PalNews we will reveal more about the most recent discoveries of vertebrate burrows in Southern Africa - GHG)

I have visited Olduvai Gorge

By Recognise Sambo
University of the Witwatersrand



Olduvai Gorge is the world's best known and archaeological site where the evidence of the first humans (*Homo habilis*) was found, it is also known as the Cradle of Mankind in the Ngorongoro conservation area in northern Tanzania. This site has been made famous by the Leakey's from the 1950's onwards and today researchers all round the world continue to conduct their research there.

The purpose for my visit to the most famous Olduvai was for the Geology and Paleoanthropology field school (from 18th May- 24th June 2016) hosted by Department of Geological Sciences of Indiana University in Bloomington USA and directed by Dr Jackson Njau and Professor Jim Brophy. Six weeks at Olduvai have been nothing but the best, most unforgettable period of my life and this is what makes it memorable: field course activities, hiking, social life, local cultures, and excursions to other famous places like Serengeti, Laetoli, and Oldoinyo Lengai (Lake Natron).

Geology and Paleoanthropology of Olduvai Gorge

At Olduvai every day was planned for specific activities. For instance, we would have geology and paleoanthropology lectures in the mornings and sometimes in the afternoons and then go out into the field or the gorge. In understanding the geology of Olduvai Gorge we looked at the stratigraphy (origin, composition, and the distribution and succession of strata) and different depositional environments, sedimentary facies, and faulting that occurred and formed the Gorge millions of years ago.

For someone without any geological background I found identifying different depositional environments (e.g. lake or lacustrine, lake Margin, fluvial and alluvial) and types of faulting in the Gorge very fascinating because each day there was a strong emphasis on these features, either in the field to identify their characteristics or sometimes taught in class. However, this made me realize regardless of my passion and love for archaeology it is also crucial for me to know and understand the geological context of any given archaeological site.

With a special interest in human and animal remains and also human evolution, I really enjoyed studying the paleoanthropology of Olduvai Gorge that includes (the Stone Age Archaeology of Africa, Zooarchaeology, Vertebrate taphonomy, and Paleontology).

Paleoanthropology lectures and class exercises were fun but not as much fun as going out on the field hunting for fossils and excavations. What was fun about this was being able to apply the knowledge acquired from lectures to answer questions like what bone is this and to which species does it belong, simply by identifying bones scattered all over the gorge and in their primary context

(in situ) when excavating. This practical experience at Olduvai was an amazing experience, and knowing that practical work overrides just reading, I was finally certain and convinced that I am in the right field of study.

Masaai local culture

Predominantly the local people at Olduvai both at the Leakey Camp and the surrounding areas are the Maasai, one tribe (very traditional) that is today known for their high jumping dance and livestock keeping, especially cattle and goats. Talking from experience, the Maasai are very peaceful and warm-hearted who are concerned about other people's wellbeing. With a smile every day from morning till evening, they threw the Mambos and Jambos (greetings) at us, wanting to know if we are doing okay. They created no boundary for socializing and they were very patient with us when teaching us their Swahili (local language that unites every Tanzanian, and extending to Kenya). Most are illiterate, but their knowledge about geology and archaeology is as good as the knowledge of someone who has already obtained a Master's degree. Living with them for six weeks really humbled me

Social Life

Most of the students were from the US, two from South Africa, and one from Tanzania. As students, we worked together very well and learnt and shared new things from each other. We have also managed to survive for weeks at Olduvai, regardless of the living conditions, such as sleeping in tents, without any flush toilets or proper showers after an extremely hot, long day in the field and always covered in dust. Nonetheless, what kept us going everyday was our eagerness to know Olduvai in and out before going back home.



Hikings and leisure

We hiked almost all the smallest to the tallest hills of Olduvai Gorge and Oldoinyo Lengai. We also had all the time in the world to play after rough field days and exercises. We also visited places like Laetoli (a site with evidence of hominin footprints), Serengeti, and Lake Natron.

How did I get the funding to go to Olduvai?



Participating in the Olduvai Gorge field school was quite expensive. However, I was one of the most fortunate students in South Africa to be awarded the African Ambassador by Indiana University in the USA. The Scholarship was partial only covering tuition fee and Tanzania migration and study fees (\$7500). However, as a student it was my responsibility to look for extra funding to cover the field cost and airfare, and well, I did just that. I went up and down, from one department to another like the Department of Geography, Archaeology, and Environmental studies (GAES) and the Evolutionary Studies Institute (ESI) looking for extra funding. Seeking these funds was draining and made me feel helpless at times. Fortunate enough, one of my Lecture Prof Sarah Wurz offered to take responsibility of the airfare and that really gave me hope. A few weeks later, while still trying so hard to get the money for the field cost, I realized that there were still people who really wanted me to go me to Olduvai Gorge, people like Dr Christine Steininger from the ESI who paid R40 000.00 and, Dr Dominic Stratford from (GAES) who paid the remaining R8500.00, which

which was enough to completely cover the field cost. With all the money available, I was ready to go to Olduvai to acquire all the experience I need for my field of study.

With all this being said, I would really like express my sincere gratitude to the above mentioned warm-hearted people (Dr Jackson Njau, Prof Jim Brophy, Prof Sarah Wurz, Dr Christine Steininger, and Dr Dominic Stratford) who did not only contribute money to get me to Olduvai, but people who also supported me to go all out and pursue my passion and dream.

Many Thanks!!!



Namibian News

By Helke Mocke

National Earth Science Museum, Geological Survey of Namibia, Windhoek

During the last few months the National Earth Science Museum and staff were very active both in the museum and the field. Here are some highlights.

On 19 – 23 September 2016, the National Earth Science Museum once again participated in the National Heritage Week. A special exhibition under the theme “Geology and Culture” was developed showcasing birth stones (gems), San rock art in Namibia and the use of and mineralogical characteristics of Ovahimba ochre.

Several school groups received tours in the museum, including Fidel Castro Primary School, Delta Primary School, Amazing Kids and Van Rhyn Primary School.



Happy faces: School pupils excitedly view new exhibits during Heritage week.



After a long wait our two new interactive displays, a dinosaur digging pit (top) and an electronic earthquake (bottom), finally arrived in the museum. There is still some work to be done before we can launch them. In the meantime a local artist has created a sign for the dinosaur pit.

Projecto PalNiassa: Update

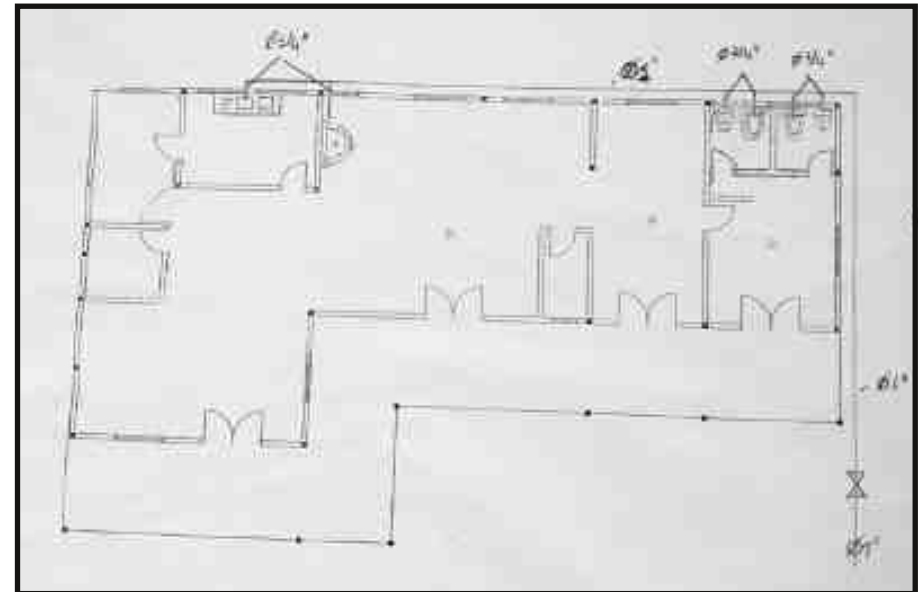
By Ricardo Araújo, Dino Milisse, & Nelson Nhamutole

We are extremely happy that the construction of the new infrastructure of the Museu Nacional de Geologia is coming to an end. This is a dream coming true. This will be a state-of-the-art fossil preparation laboratory and we are expecting that it will be ready sometime in the first months of this year. Finally, the Mozambican fossils will have a place to be prepared, in Mozambique! The fossil lab will have a chemical preparation room, a mechanical preparation area, a cast and moulding room, a storage for keeping the fossils, a room to house unprepared field blocks, and another one to keep all the field equipment. The fossil preparation laboratory was designed considering the challenges of the tropical city it is built upon: Maputo. The main risks to the preservation of the fossils are floodings and large annual temperature fluctuations.



A field trip was undertaken to the Neckertal Dam building project SW of Keetmanshoop from 3-8 July 2016. The team collected thirteen well preserved pieces of fossil wood (top) on Farm Schlangkopf 124 (Prince Albert Formation).

During this trip we also visited Farm Spitzkop and received a tour by the famous Oom Giel Steenkamp (above). We were treated to the sight of beautifully preserved *Mesosaurus* fossils and Oom Giel was very entertaining. I recommend that if you are ever in the vicinity of Keetmanshoop, to visit his farm located a few kilometres north of the town.





Therefore, the lab is equipped with an effective drainage system and the whole lab is raised one meter above the land surface, also to maintain a constant temperature a specialised air conditioning system will be installed. The temporary fossil lab that is currently running in an adjacent building will be completely transferred to the new infrastructure. The new fossil lab will also host guided visits and practical classes for students of various Mozambican universities, thus it will become an educational center in the long-run with the ultimate goal of preserving the amazing Mozambican fossil heritage.

For more information on the project, please visit us at our official website at: www.palniassa.net.

From the Burke Fossil Lab

By Christian Sidor
Burke Museum, University of Washington



My graduate student, Brandon Peacock (top left), defended his PhD thesis in December and will be starting as a postdoc at the Field Museum with Ken Angielczyk in January. Along with two students (Meg Whitney and Larry Mose), I published a paper on a 255 million year dental tumor

in a gorgonopsian fossil from Tanzania (bottom left and right). The paper titled "*Odontoma in a 255-Million-Year-Old Mammalian Forebear*" was published in the Journal of the American Medical Association – Oncology, which was quite the departure from the usual paleo journals we're all used to.

I plan to be in Cape Town in mid April to work with Roger Smith at Iziko Museum, and gather comparative data for our continuing projects in Tanzania and Zambia.

From the UCT Palaeobiology Research Lab

By Irya Maharaj
Univerisity of Cape Town



Meet the team!: From left, Irya Maharaj, Matthew Scarborough, Delphine Angst, Chris Shelton, Marc Burman, Anusuya Chinsamy-Turan, Emil Krupandan and German Montoya.

After having been HOD for 4 years, Anusuya Chinsamy-Turan was very relieved to be an “ordinary” academic in 2016 with just the usual load of teaching and research. The second six months of the year was even better, since Anusuya had the opportunity to take sabbatical leave. Anusuya attended the International Comparative Vertebrate Morphology meeting in Washington DC, where she presented some of her recent collaborative research on sauropodomorph growth patterns. Anusuya attended the PSSA meeting in Stellenbosch immediately after, where she spoke about the rather unusual bone tissues she and her Argentinian colleagues found in a titanosaur. This work was published in *Nature Scientific reports*.

After the PSSA meeting, Anusuya’s former postdoc Aurore Cannoville stayed on to finish off the write up on pareiasaur bone histology (which is now available online), and to begin new collaborative research on giant birds. Later in the year, Anusuya attended the Society of Avian Palaeontology and Evolution (SAPE) meeting in Diamante in Argentina where she presented preliminary research findings on *Aepyornis*, the giant extinct bird from Madagascar. Besides these projects, Anusuya has also enjoyed working with her postdocs and postgrads on various research topics. While in Argentina, Anusuya received the good news that she obtained an NRF A-rating. This marks an important milestone in her career!



Besides catching up with various projects during her sabbatical, Anusuya also developed an online course on extinctions. The course will launch March 2017 through the UK Open University’s Futurelearn platform. The course is designed for anyone, even the general public, so no pre-requisites are necessary. For more information go to <https://www.futurelearn.com/courses/extinctions-past-present>

Delphine Angst is currently in her second year of postdoctoral research in the University of Cape Town. Her main research project is to assess ontogenetic development and sexual dimorphism of the bony crest of the Guinea fowl. Besides this research, she has also been involved in other projects in parallel. She also published two papers with Eric Buffetaut describing new specimens of *Gargantuavis*, a large Cretaceous bird from Southern France and Northern Spain; and a third paper is currently in press. She is also continuing to work on the locomotion of large ground birds, and she currently has a manuscript about the locomotion of the large South American fossil birds currently under review. She is also working with Anusuya and Aurore Canoville, on understanding the link between locomotion and the bone microstructure on giant extinct and extant terrestrial birds; and is also involved in the bone histological study of the *Aepyornis* (fossil elephant bird from Madagascar). Additionally, she and Anusuya are working with British researchers Lorna Steel and Julian Hume (from BMNH) on the bone histology of *Dodos* from Mauritius. This work is currently under review. Finally, during the last year she participated to the SAPE) meeting in Diamante (Argentina) where she presented papers on the locomotion of the South American large fossil birds, and on the first bone histological study of the Dodo

Christen Shelton recently presented some of his post doc work on Dinocephalian bone histology both here and abroad at the PSSA meeting in Stellenbosch and at SVP in Salt Lake City, UT. Two manuscripts are in the process of being written and will shortly be submitted: the first paper is on a bone pathology in a titanosuchid and the second is a re-description of *Anteosaurus* bone histology. Chris also co-author on a recent paper that suggests the

possible existence of a diaphragm homolog among the basal synapsids, as well as a new semi-aquatic life reconstruction for large caseid species. Chris found that their bone histology is osteoporotic-like, the only known equivalent modern analogue he found were dolphins. Most recently Chris's long awaited *Ophiacodon* bone histology monograph is in press and is due out soon. His findings concluded that fibrolamellar bone existed much earlier in the long bones of basal synapsids than previously thought.

Matthew Scarborough has been working on his PhD thesis on dwarf elephants from the Mediterranean islands. The last few months has been devoted to comparing the morphology of the long bones of the 1m tall insular dwarf elephant *Palaeoloxodon falconeri* from Spinagallo Cave, Sicily with their large-sized continental comparator *P. antiquus* from an exceptionally-preserved bone assemblage excavated from what was formerly an interglacial lake in eastern Germany. The statistical analysis is now nearly complete, and the final chapter of his thesis is being written-up with a view to completion in the next few months.

Emil Krupandan is currently also in the throes of writing up his PhD thesis on the previously unstudied sauropodomorph material from Maphutseng, Lesotho, which also involves a reassessment of material assigned to *Plateosaurus* and *Euskelosaurus* from Iziko. He has completed work on the anatomy, taxonomy, phylogeny and histology of the material from Lesotho, which is identified as belonging to *Antetonitrus ingenipes*. Bone histology of this material indicates a transitional growth dynamic intermediate between basal sauropodomorphs and sauropods. His research will ultimately provide a

formal diagnosis for the species and check its phylogenetic affinities within Sauropodomorpha and will evaluate whether some of the material historically catalogued as *Plateosauravus* and *Euskelosaurus* can be assigned to *Antetonitrus ingenipes*.

Germán Montoya started his PhD in UCT palaeobiology lab 2016 under the supervision of Anusuya Chinsamy-Turan (AC) and Marcelo Sánchez-Villagra from University of Zurich. His research is focused on the determination of ontogenetic patterns of bone growth and development of African mole rats (Bathyergidae), a speciose group of subterranean rodents with distinctive eco-physiological traits among mammals. Importantly, this project has benefitted from valuable study material obtained from several researchers around the world, including Switzerland, Czech Republic, United States and South Africa. Last year, he also was part of the team led by AC to explore Upper Cretaceous Formations in the St. Lucia estuary (KwaZulu-Natal). At the recent PSSA, he won the prize for the Best Poster (Hindlimb histology of the specialized climber, *Procavia capensis* (Hyracoidea: Paenungulata). This work was done in collaboration with AC-T, L. La Grange and Deano Stynder. Part of his Master's research is shortly to be published in the Journal of Anatomy, with AC-T as a co-author. We are all thrilled that one of the photomicrograph images from this study will be the front cover image for the February issue of the journal. From previous paleontological studies on Cenozoic mammals from the Miocene of Chile, he and co-authors have proposed a new species of Peltephilidae, an extinct family of armadillos endemic to South America (in review).

Vidushi Dabee will be completing her Masters in 2017. Her research involves an analysis of the bone depositional rates in the Nile crocodile, *Crocodylus niloticus*, using the fluorescent labeling technique which required the injections of fluorescent markers into juvenile crocodiles at various stages of their growth. Using a confocal microscope, she is assessing the fluorescence of the different markers and the distance and time between them to calculate the rate of bone growth. She is currently in the writing up phase of her Masters.

Iyra Maharaj joined the UCT Palaeobiology group in February 2016 as a Masters student after completing her honours in Genetics at UKZN in 2015. Her research is being supervised by Anusuya Chinsamy-Turan and Roger Smith, and focuses on a non-mammalian synapsid from the Late Permian called *Endothiodon*. One of the important aims of her research is to describe the anatomy of the (possibly) largest and most complete skeleton of *Endothiodon* found that is housed at the Iziko Museum in Cape Town (and featured in the previous issue of PalNews). As a beginner to palaeontology, Iyra has attended a few undergraduate and honours courses in palaeontology, and had to spend a lot of time studying dicynodont anatomy. She has begun looking at as many *Endothiodon* specimens from South Africa as possible at the Iziko Museum in Cape Town, the ESI in Johannesburg and the Council for Geosciences in Pretoria, and she will continue collection work at Albany Museum in January 2017. Her dissertation will be written up and submitted before the end of 2017. She attended her first PSSA meeting in July, and in September she also participated in a field expedition with the rest of the lab to St Lucia in KwaZulu-Natal in search of vertebrate material.

From the Albany Museum

By Rose Prevec

Albany Museum, Rhodes University, Grahamstown



Our little Grahamstown palaeo community has had a rewarding second half of the year. The addition of three wonderful, motivated students to the department in 2016 certainly livened things up! Aviwe Matiwane continues her studies on *Glossopteris* floras from Sutherland with her characteristic enthusiasm, and we had a most rewarding fieldtrip in September (see Aviwe's account below). Jonas Vijverberg and Maike Diekmann (above) from the Geology Department at Rhodes, were a joy to supervise, both looked at *Glossopteris* leaves from different localities around the Eastern Cape, and they each produced an excellent honours project, earning them top marks in their class. Rob continues to work his magic on the massive Devonian collections he has accrued over

the years, producing yet another Nature paper in early January, and making the international news. He has also been busy with rescue operations at his new road cutting, and is finding exciting material. We received fantastic news that Rob has funding for the next three years, which will enable him to continue his work at the Museum. Chris Harris has been assisting Rob in his endeavours, although Chris has now moved to Wits to do his Honours at the ESI. Khokela Camagu has a new colleague in the preparation laboratory, Uviwe Bolosha, who has been assisting us greatly in the curation of our new plant fossil collections, and who has also been helping Aviwe with data collection. Billy de Klerk has been gallivanting all over the world, enjoying his retirement far too much. He still makes time to keep an eye on us at the Museum, and continues to give public talks. In October the department held a very well-supported lecture series (below).



Lecture series:
Organized by
from clockwise
left Billy de
Klerk, Rob
Gess, Aviwe
Matiwane, and
Rose Prevec.

I have also been gallivanting. I attended the International Organisation of Palaeobotany Congress in Salvador, Brazil, where I met up with some familiar South Africans - Marion Bamford, Natasha Barbolini and Heidi Anderson-Holmes – and many other friends and colleagues.

After a memorable conference I flew to Buenos Aires where I met up with my colleague Dr Bárbara Cariglino at the Museo Argentino de Ciencias Naturales "Bernardino Rivadavia". Bárbara, Seba and I travelled 2000 km south into Patagonia in search of Permian plant fossils. We visited several known sites where we found beautiful new material (bottom left and right), and added to the spectacular existing collections of the *Glossopteris* floras of the region. The stark beauty and subtle colours of the Patagonian landscape were magnificent, and I saw a great deal of wildlife, including many maras (large, galloping rodents), the ubiquitous camelid guanacos standing sentry along the hilltops, groups of alarmed rheas with flocks of fluffy babies, and charming scuttling armadillos.

We also had time to visit the vast 'Monumento Natural Bosques Petrificados' with its giant and ancient fossilized trees lying where they were felled by a volcanic eruption during Jurassic times (top middle), and even stopped off at Punta Tombo to visit a Humbolt Penguin colony (bottom right).



The *Glossopteris* groupies

By Aviwe Matiwane
Albany Museum, Rhodes University, Grahamstown



The Team (left to right): Marc Van Den Brandt, Aviwe Matiwane, Khokela Camagu, Rose Prevec, Mike Day, and Jaco Groeneveld.

In September, a team consisting of researchers from the Albany Museum (Dr Rose Prevec, Aviwe Matiwane, and Khokela Camagu), Wits ESI (Mike Day and Marc Van Den Brandt), and Jaco Groeneveld embarked on a two week field trip to Sutherland in the Northern Cape. The trip aimed to collect plant fossil material for my research and for plant fossil exploration. We divided our time and excavated two main sites, one in Ouberg Pass and the other in the Onder Karoo. For the first couple of days we explored Ouberg Pass where we discovered three new plant fossil sites, and we spent time preparing a bench for excavation at a site Jaco had previously discovered. We found tons of wonderful leaves, fruitifications, seeds, and

scale leaves. We then headed off to the Onder Karoo site where we made some interesting discoveries. A special mention must go to Marc and Jaco who discovered the



Sutherland (Clockwise from left): Jaco, Marc, and Khokela did a wonderful job clearing the bench for excavation. Some of the amazing fossil flora we collected. Rose showing Mike some plant fossils. Breathtaking views of Ouberg Pass. Khokela and I setting up an area to place the fossils. Beautiful *Glossopteris* leaf fossils collected from the Onder Karoo. The road to the Onder Karoo site.

the first small body insect, which is possibly new to science. Two more insects were later collected by Rose including a large variety of insect wings. Of the entire new fossil collection (excluding my leaves) my favourite discovery was a *Squamella* fruitification, a first for South African palaeobotany. I cannot describe the joy and excitement I had during this trip collecting my precious *Glossopteris* leaves (yes, leaves!). I am looking forward to sharing all these new discoveries with you at our next PSSA meeting. The trip was a huge success, and I would like to thank everyone for their time and effort in the field and making sure I have a wonderful fossil collection for my research.

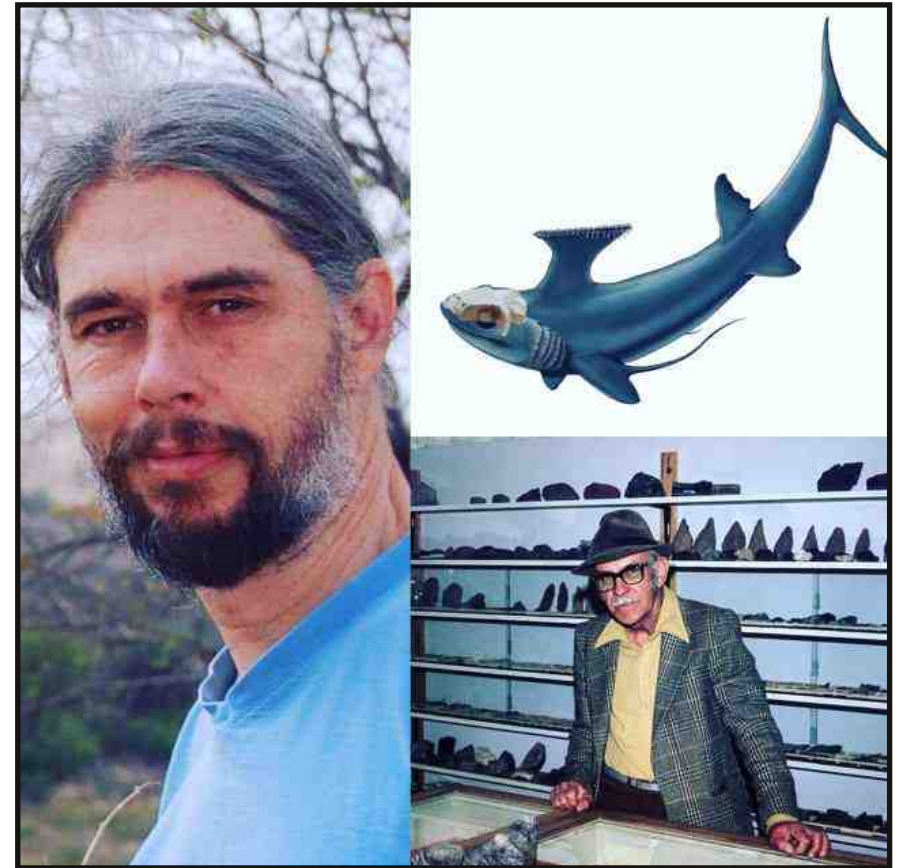
The year ended off with a series of lectures in celebration of the Department of Earth Science's 160th birthday at the Albany Museum. Billy de Klerk started off the talks with the history of the department, and the key collection contributions made over the years. This talk was followed the next day by Rob Gess who presented on the fossil discoveries he has made over the years, and the Devonian collection at the Albany Museum. Rose Prevec was the third speaker of the week and her talk focused on the importance of ancient forests in the South African economy. I concluded the series presenting on the work I am currently doing in Sutherland, and shared some of the discoveries we made during the fieldtrip. The week long celebrations were a huge success and it was great engaging with the Grahamstown community, and they provided a great platform to strengthen our ties with the friends of the museum.

P.S. Please follow our Instagram page (handle: @palaeo_botanists) for more pictures from the fieldtrip and to also see what amazing things we are getting up to at the Department of Earth Sciences.

SA fossil sheds light on chimaeroid origins

By Rob Gess

Albany Museum, Rhodes University, Grahamstown



Dwykaselachus: Clockwise from left. Dr Rob Gess, *Dwykaselachus* reconstruction with skull scan shown, and Roy Ooshuizen, the original discoverer.

High-definition CT scans of the fossilized skull of a 280 Million-year-old fish reveal the origin of chimaeras, a group of cartilaginous fish related to sharks. Analysis of the brain case of *Dwykasselachus oosthuizeni*, a shark-like fossil from South Africa, shows telltale structures of the brain, major cranial nerves, nostrils and inner ear belonging to modern-day chimaeras. This discovery, published early online in *Nature* on January 4, allows scientists to firmly anchor chimaeroids—the last major surviving vertebrate group to be properly situated on the tree of life—in evolutionary history, and sheds light on the early development of these fish as they diverged from their deep, shared ancestry with sharks.

“The origin of holocephalan fish (chimaeras) has long puzzled scientists, who had worked out the evolutionary relationships of all other major living vertebrate groups. Chimaeras were clearly somehow related to sharks and rays but they are very different, with a very distinctive skull. All fossil chimaeras were already completely chimaera so they were not recognised in-between forms to bridge the gap between their ancestors and the ancestors of modern sharks. Our research demonstrates that *Dwykasselachus* provides the missing piece of the puzzle, as it has features of certain primitive ‘sharks’ as well as of chimaeras. We can now anchor chimaeras firmly on the tree of vertebrate life.” According to Dr Rob Gess, a co-author on the study and currently a South African CoE in Palaeosciences partner, based at the Albany Museum in Grahamstown. There are about 50 living species of chimaeras, known in South Africa as Josef, St. Joseph sharks or elephant sharks. They represent one of four fundamental divisions of modern vertebrate biodiversity and are actually very different from sharks – with large eyes and tooth plates adapted for grinding prey. St Joseph's sharks generally live very deep in the ocean, but

come into shallower waters to breed in summer. As a result they are often caught in summer as bicatch and are also sometimes deliberately netted on the west coast of the Western Cape. Their meat is however rather oily and they are not a popular dish. “Sharks and chimaeras both have skeletons of cartilage so, other than teeth and fin support spines, fossils of both groups are very rare. None of these had previously shown a combination of characters of both groups,” according to Dr Gess.

The *Dwykasselachus* fossil resolves this issue. It was originally discovered by amateur paleontologist and farmer Roy Oosthuizen in the 1980s. Roy Oosthuizen discovered the fossil on his farm, Zwartskraal in the Prince Albert district. He was out in the veld with his son one day when he found the nodule of rock that had weathered out of 280 Million year old mudstone, just 30 centimetres above the top of the Dwyka glacial deposits. Thinking that it might contain a fossil he asked his son to hold it edge on whilst he hit it with a hammer. It split into 3 pieces, revealing parts of the fossil skull. It was named by palaeontologist Burger Oelofsen in the eighties. The fossil cartilage is however very thin and couldn't be excavated out of the rock, so he could only describe what was visible on the broken surfaces of the nodule. The most important features of the fossil weren't accessible at the time. After that it was archived in a small cardboard box in the strongroom reserved for type specimens at the South African Museum in Cape Town.

There it remained until 2013 when Wits' Evolutionary Studies Institute obtained a micro-CT scanner. “At the time I was a South African CoE in Palaeosciences partner at Rhodes University Geology Department,” recalls Dr Gess. “I immediately requested permission to try scanning some early shark fossils. Initially my main focus was some mid Devonian (420 – 360 Million year old)

specimens from the Klein Karoo, Mike Coates, suggested that I should include Early Permian *Dwykasselachus* in my study. I obtained permission from Iziko Museums to loan it from the South African Museum in Cape. From there I took it up to Wits and we spent days getting the best possible scans. It scanned incredibly well, so our team were able to create a perfect 3D digital image of the skull, inside and out”. *Dwykasselachus* appeared to be a symmoriid shark, a bizarre group of 300+ Million year old sharks, known for their unusual dorsal fin spines, some resembling boom-like prongs and others surreal ironing boards. CT scans showed that the *Dwykasselachus* skull was remarkably intact, one of very few early cartilaginous skulls that had not been crushed during fossilization. The scans also provide an unprecedented view of the interior of the brain case. “When I saw it for the first time, I was stunned. The specimen is remarkable.” recalls Dr Mike Coates, the paper’s lead author and Professor of Organismal Biology and Anatomy at the University of Chicago.

They show a series of telltale anatomical structures that mark the specimen as an early chimaera. The braincase preserves details about the brain shape, paths of major cranial nerves and the anatomy of the inner ear. All of which indicate it belongs to modern day chimaeras. The scans reveal clues about how these fish began to diverge from their common ancestry with sharks. The study, “*A symmoriiform chondrichthyan braincase and the origin of chimaeroid fishes*,” was supported by the NSF, NRF, CoE in Palaeosciences, and the NRF African Origins Programme. Dr Gess was further supported by Rhodes University Postdoctoral bursary. Additional authors include John Finarelli from the University College Dublin, Ireland, and Katharine Criswell and Kristen Tietjen from the University of Chicago.

Brazil IOP 2016!

By Heidi Anderson-Holmes & Keith Holmes



The conference was in Salvador city, which is rich in culture, historical sites and has the first urban elevator ‘Lacerda’. This was used as a conference theme: towards new frontiers”. Keith and I took a ride on it and paid the small charge fee. The congress was held in the Bahia Othon Palace, a 1970’s hotel complex overlooking the sea. My talk “Generic and specific problems and concepts in Molteno and Gondwana palaeobotany” was on the first day, so then I could concentrate on the other talks and posters. I also advertised our Molteno Flora books and had so much interest that I could have sold a suitcase full. It resulted in many orders which I posted later from the other side of Gondwana. South Africa was well represented by

Rose Prevec, Marion Bamford (who celebrated her birthday there) and Natasha Barbolini. We made new contacts from Brazil and enjoyed seeing some familiar faces from around the world. My first IOP was the initial one held at Reading University way back in 1980. After a very hectic conference week (feasts for breakfast, non-stop lectures, quick dips in the pool and some sleep) we said goodbye to our hotel along the Atlantic Coast with all the skyscrapers and passed many of the poorer areas which were so colourful. One evening we went to a local show and enjoyed the energetic dancing by the Bahia Africans and local spicy food with so many tropical fruits.



The field trip to Chapada Diamantina took us inland, some 500 km through dry country to a feast of flat topped mountains, caves, waterfalls rock engravings, forests, birds and plants (no fossils except for traces from the pre-Cambrian). The local diamond rush was short lived once the alluvial treasures were all excavated. Keith and I



took a detour to visit the Falls shared by three countries. We stayed on the Brazilian side at the Belmond Hotel das Cataratas in the Iguassu National Park. We could enjoy the falls before the influx of tourist busses, even at night. The falls are vast and noisy. In the forest are racoon sized animals with a long snout. We only had one full day but enjoyed it to the limit and so felt it worth all the Reas spent.

The highlight was visiting Professor Tania Dutra and her student Ronaldo Barboni (who now has his PhD in palaeobotany and specially joined us for a week). Her university UNISINOS (started by Jesuits) in Porte Alegre is one of the few private ones and has a strong geology and palaeontology department. We were able to study the equivalents of the Triassic Molteno and *Nymboidea* Floras from the Santa Maria Formation. These fossils are beautifully preserved in a pink sediment with interesting black iron encrustations. This also occurred at a Jurassic site



and the chemistry is currently being studied by a PhD student. We took a weekend trip to the inland plateau (formed by Gondwana basalts) where there are remnant forests of *Araucaria angustifolia* locally called Pinheiro Brasileiro. We palaeobotanists were in Seventh Heaven, seeing one of the largest trees over 700 years old (42 m high, diameter 2.7m) and many regrowth forests that are now protected. We could just imagine the dinosaurs reaching up to eat the nutritious seeds in the large cones. A large epiphyte flora grows on these trees including a rare red orchid.

We extend thanks to the IOP congress organisers and particularly to Tania and Ronaldo our dear friends on the other side of Gondwana. If you would like to know more about our trip – come and visit.

News from Wits ESI

By Mike Day
ESI, Wits University



Karoo boyband: The February 2016 ESI expedition to the Moordenaarskaroo, minus Julien Benoit and myself, attempting a boyband group photo at dusk. (left to right) A shameless Vincent Fernandez, Sifelani Jirah, Leandro Gaetano, Marc van den Brandt, Frank Schie, Bruce Rubidge, and David Groenewald.

This last year has seen the end of a long struggle with biarmosuchians. Many hours of mental toil have finally led to a new hypothesis of how these unusual creatures are related to each other, in particular the separation of the peculiar large middle Permian genera from the smaller, late Permian ones. This is not the end of the road though, and I feel this is only the beginning for the group as new finds from South Africa and further north are going to fuel this debate in the near future.



Fieldwork adventures: (top left) A spiralled burrow? in the upper *Tapinocephalus* Assemblage Zone near Sutherland; the first I've found so early. No evidence of bone though to indicate the maker. (bottom left) Marc van den Brandt carefully gluing together the broken pieces of a *Pareiasaurus* skull that had met with a mishap in its case at the Fraserburg Museum. He dutifully performed this act of palaeo kindness while I snapped photos of their wonderful *Struthiocephalus* skull, on the return journey from Sutherland. (right) The view from Aviwe and Rose's excavation site on Ouberg Pass. Walking this road exercising my geology skills was a lovely way to spend a week.

But when not contemplating bizarre characters and slogging through R, I did find time to get into the field. In February I was in the Moordenaarskaroo, north of Laingsburg, to explore the *Eodicynodon-Tapinocephalus* AZ boundary with Bruce Rubidge and an enthusiastic team from the ESI consisting of Julien Benoit, Sifelani Jirah, Marc Van den Brandt (pictured above), David Groenewald, strongly augmented by Leandro Gaetano (CONICET, Argentina) and Vincent Fernandez (ESRF, France). We were further bolstered over the two week trip by the Viglietti's on a trip up from Cape Town and a contingent from Stellenbosch (Ryan Tucker, Schalk Walters and Louis Jonk). Fossils were not uncommon in the north of the area but in the south few vertebrate fossils were to be had. None of us will forget the barren lands and withering heat of Sandkraal any time soon. This is an horizon we must collect again soon, and by soon I mean this coming February. In between attending the series of

in South Africa mid last year, I was invited to teach the third year vertebrate palaeontology course at Rhodes, which amongst other things gave me an opportunity to visit the Rat and Parrot. Around the same time I joined Bruce and David Groenewald in the southern Free State, looking at some of the many fossils David had found in an area that had previously produced only a single specimen. His work differentiating the assemblage zones and Beaufort facies in that area are proving very fruitful. I was again in the field in September, this time just with Marc Van den Brandt, to join Rose Prevec, Aviwe Matiwane and Khokhela Camagu at Sutherland. My task was to play the role of geologist and identify the contact of the Eccia and Beaufort groups, something that any long-term student of Bruce Rubidge will be able to do. Marc was not so constrained and found time to pick up the first vertebrate remains from below the top of Ouberg Pass. Nicknamed 'the owl pellet', this fossil remains safely in its nodule but

will hopefully contain some helpful organism that can be used to identify the biozone at the base of the Pass. At the end of last year I was Europe bound and, in December, found myself at the annual meeting of the Palaeontological Association in Lyon, France. A nice bunch of people with time to catch up with Richard Butler and Paul Barrett, as well as meet David Bond from the University of Hull to talk about mass extinctions in the Permian. Now the new year has begun and with it the work, but there is much to look forward to. The Karoo beckons...

Our ancestors sixth sense and evolution of warm blood

By Julien Benoit
ESI, Wits University

The french philosopher René Descartes (1596-1650) believed that the pineal gland, a tiny button of neuronal cells located in the depth of our brain, was the place of origin for the soul. Thanks to palaeontology, genetic and developmental studies, we now know that it is actually the evolutionary relict of a long vanished organ, the third eye. Also called the pineal eye, it is a receptor located on the top of the head in many extant reptiles such as monitor lizards, some iguanas, and the tuatara. Like a regular eye, this receptor is made of a cornea, a lens and a retina, but unlike it, it is usually covered by a thick and large scale and it is sensitive to light variations only. Our paired eyes



and the pineal eye of reptiles are in fact very similar in terms of embryological development and the genetic pathway that controls it. This resemblance is more pronounced in the fossil record as 400 Million year old fossil fish have two foramina for the pineal eye. This implies that the pineal eye used to be a paired structure in our remote fish-like ancestors, just like our eyes are today.

A third eye, what for?

If the pineal eye senses variations between day and night, then what is its function? Our paired eyes also serve this function, so what is the point of a seemingly redundant organ? In reptiles, the pineal eye acts as a calendar. Since it can observe changes to daylight length, it can also tell the brain when seasons are changing. Therefore it monitors most life cycles such as sleep and reproduction rhythms. Surgical experiments on lizards have also shown that removing the pineal eye affects their capacity to regulate their body temperature. This means that in ectotherms, the pineal eye is necessary for thermoregulation. This is fascinating since our pre-mammalian ancestors did have a pineal eye and lost it in the course of their evolution. This suggests that following the reduction and disappearance of the pineal eye through million years, we may be able to point out the time when our ancestors became endotherms.

The pineal foramen

Fortunately, the evolution of the pineal eye is very easy to study, since it has an unmistakable bony correlate, the pineal foramen. This is a tube that pierces the skull roof to accommodate the pineal eye and nerve. Most of our ancestors, the therapsids, have such a foramen on the top of their fossilized skull. It is thus reasonable to assume that it was fulfilling a similar role in thermoregulation than it does in extant reptiles. As such, by checking for the presence of the pineal foramen in fossils dating from 300 to 200 Million years ago, it becomes possible to trace back the transition from a ectotherm metabolism to endotherm in the lineage that eventually lead to mammals. This was the ambitious goal of a study which was conducted by our team of palaeontologists from the University of the Witwatersrand (Johannesburg, South Africa). We checked for the presence of the pineal foramen in more than 600 skulls, all found in the incredibly rich fossil-bearing deposits of the South African Karoo. Our observations were assisted by innovative X-ray scanning technologies.

We found that the pineal foramen was present in most therapsids before 260 Million years ago. Only a few specimens whether pathologically or legitimately, show no trace of a pineal foramen. This suggests that the corresponding pineal eye was essential for thermoregulation in basal therapsids. The loss of the pineal foramen occurs in two lineages, including the one leading to mammals, the cynodonts which appear in the Late Permian. This means that the transition from endotherm to endotherm was probably achieved at that time. So, well before the first dinosaur even appeared, mammals had likely already evolved one of their key adaptations which probably ensured their survival through Mesozoic times and success during the Cenozoic. This ground-breaking

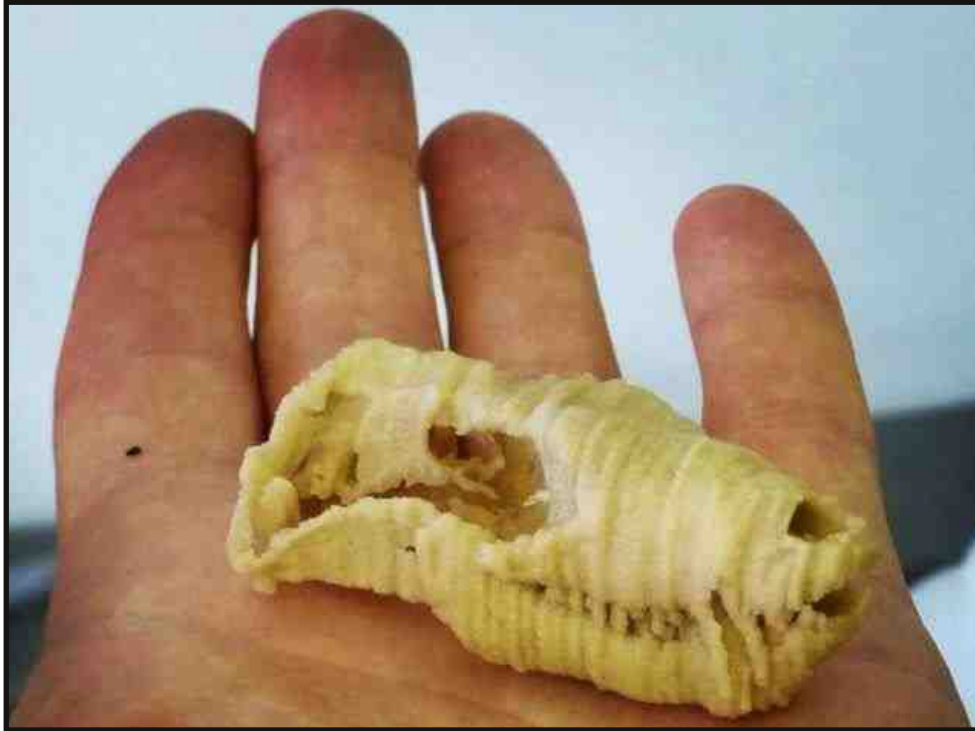
discovery was made possible by the great wealth of fossil skulls carefully housed and curated by the numerous institutions throughout South Africa. The focus on South African fossils was essential as this country was situated near the South Pole at that time, because of continental drift. Therefore, the climate was much colder and seasons were more extreme than today. This means that the observed loss of the pineal foramen was not the consequence of an environmental change toward and less difficult climate (which would have make thermoregulation easier and the pineal eye dispensable), but was really induced by a change that occurred from inside, in the physiology of the animals.

A ghost of evolution

More work is needed to address this evolutionary scenario. In effect, some endothermic reptiles, like testudines and crocodiles also lost their pineal eye during their evolution, so the story could be more complicated. Also, in mammals, photosensitive cells actively play the same role as the pineal eye in monitoring life cycles. Therefore, the loss of the pineal eye may reflect the appearance of these special kind of cells. The only thing sure is that we no longer have a third eye. However, we have a pineal gland which still secretes melatonin and serotonin that play a crucial role in the control of life cycles. The only reason this pineal gland, so small that it could be easily replaced by any other brain structure, is still here is because it represents an artefact of evolution. This tiny button of cells and its cortege of genes and developmental constraints are a legacy of our three-eyed ancestors which lived hundreds of million years ago. So no it is not the place of the human soul, it is actually far better than this, it is a remnant of our deep pre-mammalian evolutionary roots!

How to re-create a lost mammalian ancestor ?

By Julien Benoit
ESI, Wits University



In the 1960s, South African palaeontologist A.S. Brink began a series of ambitious works to better understand the anatomy and evolution of the therapsids. As they gave rise to mammals 200 Million years ago, therapsids are highly relevant to improving our knowledge about our deep evolutionary roots. The wealth of fossils found in the South African Karoo makes this region one of the most important in the world to study mammal ancestry. They were so abundant that Brink studied some of the most well-preserved skulls cutting them at thin and regular intervals in order to assess their internal cranial anatomy.

This destructive technique is called serial grinding. Before it was invented, scholars had to wait for the discovery of naturally preserved casts of internal structures (such as the mold of the “fossil brain” of the Taung child, *Australopithecus africanus*), or by breaking fossils. Serial grinding thus provided to the only fully controlled way to access the “interior” of fossils and it is still used today when X-rays scanners don’t obtain good enough images. Because of their abundance South African therapsids were among the first fossils to be studied using this new revolutionary approach but, their abundance turned out to be a curse.

In 1961, Brink started a serial grinding study of a well preserved skull and thought it was a very common therapsid specimen. However during the process, revealed anatomical structures demonstrated that it was a new species unknown to science! Unfortunately it was too late to save the fossil, but Brink made a very thorough description which included drawings of the specimen he named *Scalopocynodon gracilis*. The designation of type specimens is a critical step when naming a new species in palaeontology. Called a holotype, it is meant to serve as an anatomical reference for future comparative works. A new species can’t be recorded without a holotype. This ground specimen was thus all the more important because first, it constituted the holotype of *Scalopocynodon gracilis* and second, it was the only one referred to this species. Therefore, this valuable and irreplaceable piece of the South African heritage and evidence of the evolution of pre-mammalian therapsids was definitely lost. The irony is that it was destroyed by the very author of the species!

Scalopocynodon gracilis was later synonymized with another, more common therapsid, the cynodont *Procynosuchus delaharpae*, but the destruction of the fossil was an irreparable loss for heritage and science. *Scalopocynodon* was thus considered dead and forgotten until 55 years later, when a team of the Evolutionary Studies Institute (University of the Witwatersrand, Johannesburg, South Africa) retrieved some drawings of the serial sections of *Scalopocynodon* that Brink made in 1961. These drawings represent each thin section cut by Brink and thus constitute an opportunity to virtually reconstruct the long lost specimen.

These drawings were digitized, and using innovative computer-based technology, every slice was digitally re-assembled in a single stack in order to reconstruct a 3D model of the original skull. Thereafter, a physical model of *Scalopocynodon* was printed in 3D to re-create a life-sized reconstruction of this specimen.

This is a great initiative for South African heritage conservation since many other specimens were studied like *Scalopocynodon* in the heyday of the destructive serial grinding technique. Moreover, by looking at this freshly 3D printed skull a taxonomist one day may judge that *Scalopocynodon gracilis* was indeed different from any other therapsid, as previously believed by Brink, and then decide that this species deserves to come back to existence.

News from the Wits ESI Dino Lab

By Jonah Choiniere
ESI, Wits University



Happy New Year to everyone and may 2017 be at least one standard deviation better than 2016!

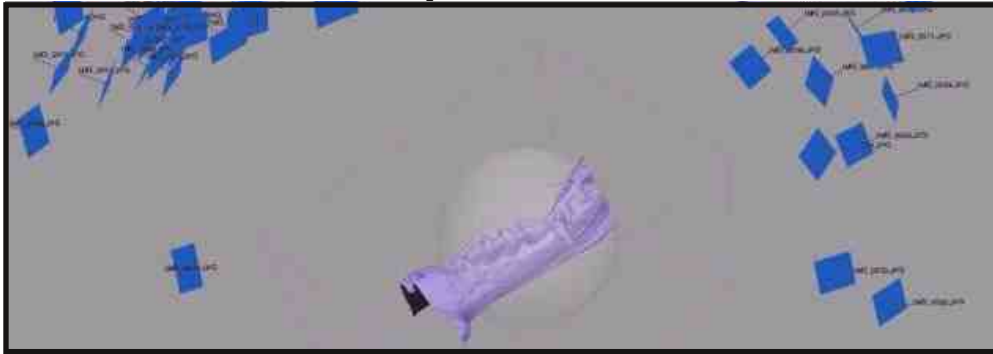
It was an eventful second half of the year, so I've enlisted various members of my lab to tell the whole story. Here, I'll just give a quick account of what my students and postdocs have been up to, and then tell a tale of working in Zimbabwe.

Farewell Blair!: Blair McPhee with his beloved sauropodomorphs, as he wishes to be remembered.

Lab Update

Postdoctoral fellows

Christophe Hendrickx has completed his round-the-world tour of gomphodont and theropod tooth collections, and is hard at work making 3D models to test hypotheses for dental complexity evolution. He's been awarded a CoE Postdoctoral Bursary for 2017. Blair McPhee has left the building, opting for the greener pastures and more permissive dress code of Max Langer's lab in Brazil. We wish him all the best! Pia Viglietti has completed her digitization and georeferencing project on historical Stormberg collections, and is hard at work putting together some initial data on taxonomic distributions and abundances in the Elliot Formation. She was awarded a CoE Postdoctoral Bursary for 2017!



Tooth model: A model of the dentition of *Traversodon* compiled by Christophe Hendrickx as part of his project on gomphodont dental complexity.

PhD students

Kimi Chapelle has submitted her proposal, which will be co-advised by Prof. Paul Barrett (NHM, London) and Dr. Jennifer Botha-Brink. She's nearing completion on phase I of her PhD project – digitally segmenting the Golden Gate *Massospondylus* embryos. She was awarded a CoE PhD Bursary for 2017!

MSc students

Kathleen Dollman has completed her degree with distinction, and is in the process of registering for her PhD, which will be co-advised by Prof. James M. Clark (GWU, Washington, DC). She's busy completing a paper on a bizarre little basal crocodylomorph called a shartegosuchid from western Mongolia. She was awarded a CoE PhD Bursary for 2017! Casey Staunton is in the final throes of writing up and will soon be moving on to her PhD. She's got great information on how the arms of basal sauropodomorphs change to accommodate a quadrupedal stance. She was awarded a CoE PhD bursary for 2017! Katherine Clayton is hard at work on her final round of edits for her MSc on the Lebombo-Tshipise Basin (main advisor Zubair Jinnah). Once she's done, we'll release her to move to the UK with her new husband Martin Brazeau! Cory Dinter has been making incredible progress on the preparation of a new, associated skeleton of a basal sauropodomorph from the lower Elliot Formation on Hannie and Nellie van Heerden's farm, Eastern Cape. She'll soon be writing up its anatomy, taphonomy, and biostratigraphy for her MSc. She was awarded a CoE MSc bursary for 2017.

Honours students

Gina Viglietti has been a segmentation machine, and is beginning to tease out the inner ear anatomy of *Prolacerta*, one of the basalmost archosauriformes known. She's been awarded a CoE Honours bursary for 2017! Finally, a huge welcome to Viktor Radermacher, Cebisa Mdekazi, Rick Tolchard, and Isabel Meyer, who are now officially joining the lab as incoming honours students for 2017. They'll be tackling projects ranging from dinosaur anatomy to croc locomotion to cynodont evolution to amphibian inner ears.

Dinosaur hunting at Lake Kariba, Zimbabwe

Museums and Monuments Zimbabwe, by Tim, Trish, and Lucy Broderick of Harare, by Dave Glynn of Harare, and by Rowan MacNiven of San Francisco. The trip was generously sponsored by the Palaeontological Trust, the Centre of Excellence Palaeosciences, the NRF, and by Rowan's family trust.

After a 5-hour drive at the crack of dawn which featured a Land Cruiser breakdown, the temporary occupation of a minibus taxi, and the purchase of approximately 50 pounds of worms, we reached the docks at Kariba town and set off in speedboats across the lake to "Dinosaur Island," as the locals call it. There we met our mobile home, the houseboat Musankwa, and killed the pain of our sunburns with a few local quaffs. The afternoon found us scrambling over boulders and shouting "booooooooooone," as we prospected the area around the original *Vulcanodon* discovery. What a unique find *Vulcanodon* must have been – we found next to nothing in its strata other than a few scrappy bone pieces! But we did discover information that will greatly improve our knowledge of this important taxon's first appearance date. We got much luckier in subsequent days, finding numerous fragments and even an associated skeleton in manganese-encrusted lag deposits on other islands in the area. Moving down-section, Steve showed us one of the richest fossil localities I have ever seen. On the shores of Matusadona National Park, this locality features abundance lungfish toothplates, scattered chunks of jaw and vertebrae, and the teeth of a large, basal archosauromorph. Secrecy about its identity is needed now, but we hope to publish in the coming year! Our last stop of the trip of course yielded many more bones than



The palaeo pirates!: (back row) Darlington Munyikwa, Jonah Choiniere, ship captain Costa, Rowan MacNiven, Dave Glynn, Patricia Broderick, Tim Broderick, Pia Viglietti, crew mate Godfrey, Michel Zonda, Paul Barrett, and Steve Edwards. (front row) Crew mates Simba and Neva, Kimberley Chapelle, and Lucy Broderick. Photo taken by Lucy Broderick

This January, I coordinated a fieldtrip to Lake Kariba on the Zimbabwean side to investigate the *Vulcanodon* type locality. We were taking advantage of historically low lake levels and of a treasure trove of fossil localities discovered by local expert guide Steve Edwards and his family. We were joined in the field by Pia Viglietti and Kimi Chapelle from Wits, by collaborator Paul Barrett of the Natural History Museum, London, by old ESI friends Darlington Munyikwa and Mike Zondo of National



A very special trip: (top left) Darlington Munyikwa (left) and Michel Zondo (right) enjoying some well-deserved R and R onboard the Musankwa. (left middle) Amateur fossil finder par excellence Rowan MacNiven trying unsuccessfully to be quiet in the presence of a jumbo (while prospecting for outcrop, of course). (left bottom) Part of an archosauromorph jaw collected by Steve Edwards - watch this space! (middle) Pia Viglietti examines a fossil forest on the shores of Lake Kariba. (right top) Kimi Chapelle reels in a new member of the Ediacaran fauna found living amongst the bream in Kariba. (right bottom) Guide and local fossil boffin Steve Edwards with a tiger.

we could collect. As the sun set we hoisted the obligatory few gin and tonics (necessary for malaria prevention) and promised to return soon.

Returning to Harare, we became intimately familiar with Zimbabwe's national laws regarding mineral collection, but the less said about that the better! Thanks are due to the crew of the Musankwa, Julie Glynn who handled all

the logistics and housed wanted felons, Mike Raath for guidance, Mitchell Riley who guided us to new localities, and our long-suffering administrative team Tandi Scott-Turner and Bronwyn Quinn, who helped me put the project together financially despite long odds.

Dinosaurs at Maropeng

By Kimberley Chapelle
ESI, Wits University



In November 2016 I was asked to design a temporary exhibit at Maropeng in the Cradle of Humankind that would showcase some of South Africa's best dinosaur and other archosaur fossils. The exhibit was to open on the 8th of December and would also mark the opening of the new exhibit space at Maropeng known as "The Gallery". It took 4 weeks of serious collaboration between myself, various ESI colleagues, Maropeng and designers to make it possible, but in the end we pulled it together!

The exhibit named "*Dinosaurs of the Veld: Meet South Africa's Ruling Reptiles*" had its media launch and opening on December 8th at 11am in the presence of Managing Director of Maropeng Michael Worsnip, Cradle of Humankind CEO Mr Makhukhu Mampuru, Professor Bruce Rubidge, and many more. It is divided into four main parts: Digging for Dinosaurs in South Africa, Ancient Reptiles, Ancient Crocodiles, and Dinosaurs. Members of the public get to learn about where and how we find fossils in South Africa, from using a geological map all the way to the preparation lab. They also get to meet some of South Africa's most beautiful archosaur fossils including the impressive *Erythrosuchus* skull, the tiny *Massospondylus carinatus* eggs, the giant sauropodomorph dinosaur we call the "Highland Giant" and the odd looking *Heterodontosaurus tucki*. The life size reconstructions on display also give visitors an idea of how large...or small some of these creatures were! All of these guys will remain at Maropeng until end of February, so if you haven't seen them yet, now is your chance!

I would like to say a big THANK YOU to everyone who helped with this project including the ESI Choiniere Bone lab, Bernhard Zipfel, Sifelani Jirah, the Maropeng and designers' team, various artists, the DST-NRF COE in Palaeosciences, the ESI, PAST, APES and the Albany Museum.

Exploration into the Eastern Cape

By Cory Dinter
ESI, Wits University



The team: The crew out at Ben's farm (left to right: Kimi Chapelle, Gilbert Mokgethoa, Cory Dinter, Pia Viglietti, Blair McPhee).

It was a cold day in August when members from the Choiniere Lab started their trip down the N1 towards the Stormberg Mountains. It was an early morning for all, but after a much-needed stopover at a roadside Wimpy's, all were reinvigorated and ready to press on. The crew led by Dr. Blair McPhee, was on a journey of scientific

exploration in the Eastern Cape to search amongst Elliot Formation outcrops for dinosaurs. We reached Hannie's farm in the evening, stiff and hungry from the drive. The farm is called Driefontein and lies near Rossouw Village. Thanks to Professor Choiniere's established rapport, Hannie and Nellie have kindly hosted paleontologists on their property for the last couple of years and were eager to chat with us, let us play with their new lambs, and learn which animals roamed their lands 200 Million years ago. They loaned us their cousin's guesthouse, and soon enough there were bodies asleep on nearly every horizontal surface. Most mornings we rose with the sun,



Go, go dino rangers!: (top left) Blair making new friends. (bottom left) Cory and Pia enjoying the weather. (right) Babe (Kimi) with babe in arms.

gulped some coffee, made sandwiches, and headed out to the H4 Quarry, which had already yielded an excellent articulated sauropodomorph specimen in a previous excavation. With the aid of some local paleontology enthusiasts (Ben MacLennan, Gillian Warren-Brown, and Ralf), we were also able to form new relationships with

other farmers eager for us to explore their lands next we return. Despite chilly weather we had a great, productive trip filled with new finds, big bonfires, and an excellent selection of libations. This beautiful countryside continues to be prosperous and we're all looking forward to our next adventure back out to the Eastern Cape!

Conference adventures

By Pia Viglietti
ESI, Wits University, & PalNews editor



Representing: (left) Katherine Clayton and I at the entrance to the 35th IGC in Cape Town. (right) Great displays at the Society of Vertebrate Paleontology, hosted by the Grand America Hotel in Salt Lake City.

It's been a very busy year of conferences for the ESI contingent, and also the dino lab. After freeing myself from the ball and chain (aka the final PhD submission), I also had the time in 2016 to present my research at one local (PSSA) and two international conferences (IGC, SVP), one of which was conveniently in my hometown Cape Town. I'll be reporting briefly on IGC and SVP.



The International Geological Congress (27 Aug-1 Sep)

The IGC was a very large conference, and with over 23 concurrent sessions it was impossible to see every talk! ESI attendees and affiliates included Bruce Rubidge, Roger Smith, Fernando Abdala, Jonah Choiniere, Michael Day, Julien Benoit, Cameron Penn-Clarke, David Groenewald, Katherine Clayton, John Hancox, Christian Kammerer, and yours truly. All gave very well received talks (top left). In addition ESI outreach also had a very well attended exhibit at the conference run by Ian Mackay and Amanda Madau (top right).

Full days meant it was difficult to make the most of being in the Mother City, but a couple free evenings meant the palaeontologists could peruse the many hipster cafes and bespoke gin bars Cape Town has to offer. A trip to the Kirstenbosch dinosaur display was also possible after the conference came to a close (bottom right).

The Society of Vertebrate Paleontology (26-29 Oct)

The ESI dino lab (Jonah Choiniere, Blair McPhee, Christophe Hendrickx, Kimberley Chapelle, Kathleen Dollman, Casey Staunton, Katherin Clayton, Cory Dinter, and myself) embarked on a 25-hour long journey out of Africa to attend SVP hosted in Salt Lake City. The unseasonably warm weather meant us South Africans were very much at home in the picturesque Salt Lake City. Cory's father (and geologist) Dr David Dinter kindly accommodated the crew in his 100 year old home nestled in Salt Lake's Greater Suburbs. We were just up the hill from a great internet cafe (home of the 20 ounce coffee that I'm sure Blair won't forget for a very long time), and a quick uber drive from the conference venue. Blair and myself gave our first ever talks at SVP, while the rest of the lab took part in well attended poster sessions. Christophe and Kathleen were in the Colbert



We made it!: (left to right) Kimi, Cory, Kathleen, Casey, yours truly, and Blair enjoying a well deserved beer (or few) after a 25-hour long journey to Salt Lake City.



prize poster session! (top right). Poor Jonah only gave his talk in the final session on the last day, but post talk beers, and an agreeable final banquet with lots of red wine made up for it. At the banquet we were joined at our table by James Clark (GW), Martin Brazeau (ICL), Roger Smith (ESI/Iziko), and Lucas Legendre (Bloemfontein National Museum) (above). A big thank you to Jonah who applied for the funds to attend the conference, and also SVP who awarded many in the lab the Jackson Travel Grant! It was a great opportunity to network and present our research on an international platform.



Let's go let's go!: (left clockwise) Our dinosaur mascot leading the way on the I-84. Blair looking very excited to set off. Meeting up with my cousin Laura and her son Caleb who live in Boise, Idaho. Cory climbing on a metal squid in downtown Seattle. Cory riding moose swings at Cal-Ranch. We made it to the potato state! (right clockwise) Cory and Blair enjoying some Washington conifers on Snoqualmie Pass. Blair and I underneath the Wishkah River bridge in Aberdeen where Kurt Cobain supposedly lived for a time. Beautiful waterfalls along the Columbia River Valley. Come as you are in Aberdeen! The view of downtown Seattle from the west Seattle ferry.

A post-conference Adventure...

After the SVP conference, Blair and myself took part in a very non-palaeontological roadtrip of the Pacific northwest. The trip was facilitated by the enthusiastic Cory, her extended family and friends, and also thanks to Dinter senior's 1986 Mazda. We drove through four states (Utah, Idaho, Washington, and Oregon) and soaked in the sights that Boise, Seattle, Aberdeen, White Salmon, and Portland had to offer. Highlights included a full day in downtown Seattle (and staying in Cory's godparents beautiful home in west Seattle), taking a ferry to Southwash and driving to Aberdeen to see Kurt Cobain's family home, Powell's bookshop in Portland, and the viewing the breathtaking natural beauty and geology along the Columbia River Valley in Oregon.

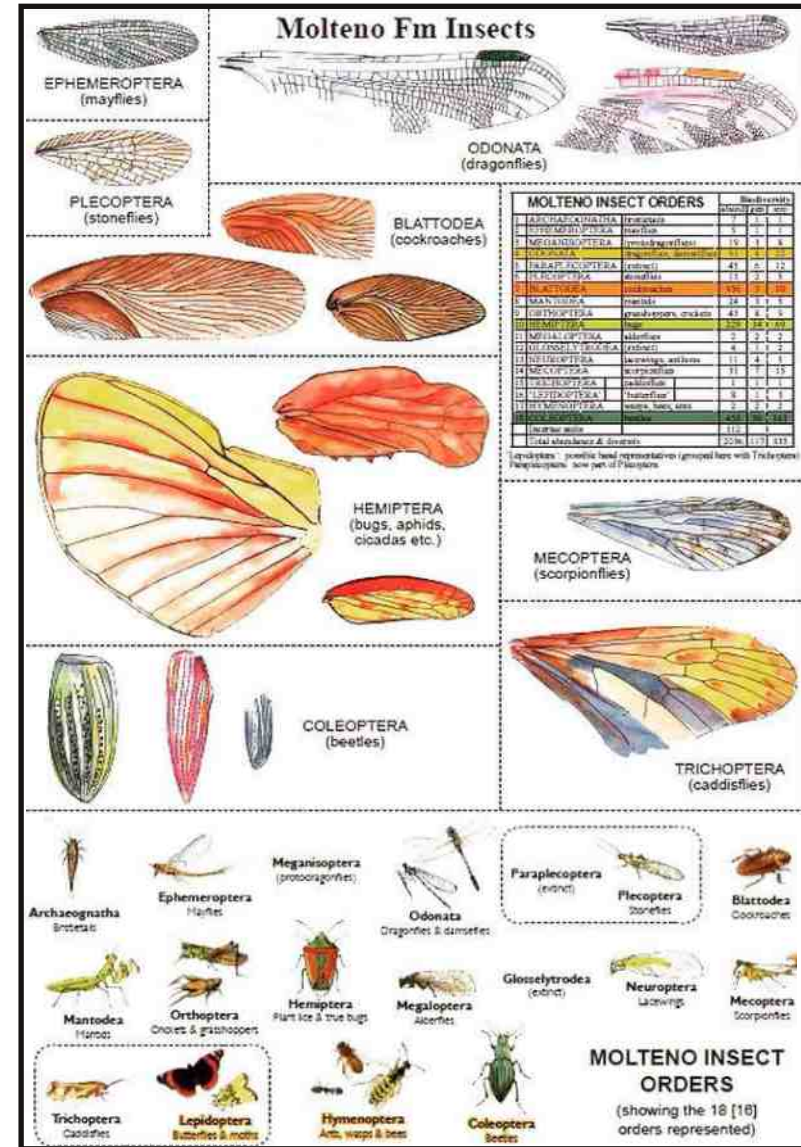
The Milky Way Galaxy, the Molteno: a brief look at insect diversity

By John Anderson
Associate Fellow, ESI, Wits University

Earth, Milky Way & the history of insects

Our disk-shaped, spiral-armed Milky Way Galaxy is huge, over 100,000 light years in diameter, and it spins at the breathless speed of some 270 km per second. Our solar system occurs about half way out from the centre of this catherine wheel. And it takes the Earth some 220 Million years to make a single journey around the Milky Way.

Interesting from our perspective is that the last time the Earth was in its current position, was pretty much midway through the Triassic (252-201 Ma) when the Molteno Fm was being laid down in the Karoo basin. This was at the height of the Triassic explosion of life following the end-Permian Extinction, when the dinosaurs and mammals were entering the scene. Likewise interesting, was that two revolutions back, when the Earth was again in a similar position—we find our way into the early days of the Silurian (444-419 Ma) in the wake of the Ordovician Extinction. This sees us back at the time of the very origin of vascular plants and of insects. Two revolutions of the Milky Way spans the colonisation of the continental landmasses by complex multicellular life.



Molteno & insect diversity

Together with several colleagues we have a 2020 Accord in place. The aim is complete the holistic study of the Molteno—plants, insects, plant-insect interactions, paleoecology, absolute dating by the end of the decade. Like so much else in the Karoo, the Molteno opens a unique window onto the world back in the days of Pangaea. As regards plants, it represents the heyday of gymnosperms globally, and possibly a moment in plant diversity akin to today.

And what of the insects? What of their diversity? We revert here to our works of the later 1990s and earlier 2000s, based on in-depth sampling from 100 plant/insect assemblages (taphocoenoses) through the geographic, stratigraphic and ecological extent of the formation. Applying the Generalised Inverse Gaussian-Poisson (GIGP) statistical distribution, based on over 2000 specimens from 43 assemblages (of the 100 plant assemblages), we arrived at: *observed* diversity (ca 350 species); *preserved* diversity (ca 8000 species); and *existed* diversity (ca 20 000 species). The Molteno consisted of a relatively simple lowland riverine plain (biome). If reasonably close to reality, this diversity compares favourably with today: with ca 50 000 observed insect species in southern Africa (south of the Cunene and Zambezi rivers). And for the first time, beetles, like today, appear to have been by a wide margin the most diverse group of terrestrial organisms.

However, we know but a fraction of the history of the richness of insects from two revolutions of the Milky Way ago till today. The great majority of research remains still to be done! The past informs the present,

and the future!

Extant insect diversity & the insect crisis

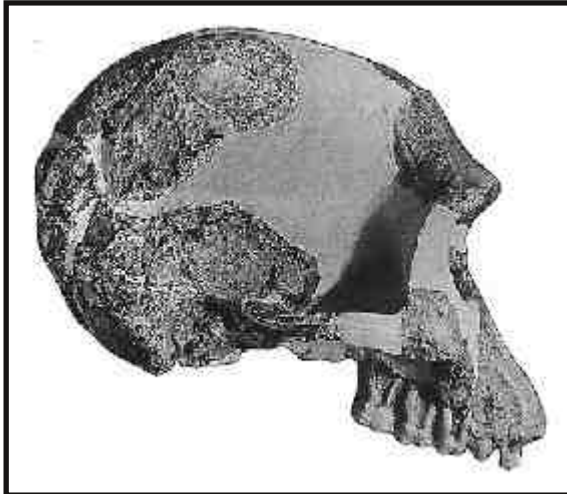
How many species of insect are there in the world today. We simply don't know. And how many species of insects are currently going extinct. We simply don't know.

Over the last 300 years or so, scientists have described close to 1 million insect species globally. Estimates as to their actual diversity vary greatly, with the mean best-projection being about 5 million. That means that 4 of every 5 insect species occupying our forests, woodlands and grasslands remain unknown!

Axel Hochkirch ('*The insect crisis we can't ignore*', Nature, 10 Nov 2016) holds the chair of the IUCN Invertebrate Subcommittee. He states, "*It's a good bet that several dozen [insect species] have disappeared in the past week or so alone.*" He challenges us globally — with great urgency—to put in the resources needed to complete a census of Earth's insects, and to ensure that we are not culpable agents in their tumbling further into decimation. "*... not only because they provide valuable ecosystem services such as pollination, pest control and nutrient cycling, but also because every single species on Earth has a right to exist.*"

Homo habilis or Australopithecus africanus?

By Francis Thackeray and Eddie Odes
ESI, Wits University



The specimen in question: Stw 53 as reconstructed by Ron Clarke.
(<http://www.talkorigins.org/faqs/homs/stw53.jpg>.)

Stw 53 is a cranium that was discovered by Alun Hughes at Sterkfontein, and then described by him with the late Phillip Tobias, as a South African counterpart to the East African specimens from Olduvai Gorge, attributed to *Homo habilis*. However, Ron Clarke has suggested that Stw 53 may instead be attributed to a species of *Australopithecus*. In this study we obtained measurements from Ron Clarke's reconstruction of Stw 53, and compared them with homologous data obtained from Sts 5 and Sts 71 (*Australopithecus africanus* from Sterkfontein), OH 24 (*H. habilis* from Olduvai Gorge in Tanzania), and KNM-ER 1813 (*H. habilis* from East Turkana in Kenya). All these hominin crania are dated within the period 1.6 - 2.6 Million years ago (Mya). We used the morphometric approach developed by Thackeray (2007), using least squares linear regression associated with the equation $y = mx + c$, to compare the

hominin crania. The log of the standard error of the slope m is called sem, and the logarithmic transformation of sem is designated log sem. A mean log sem value of -1.61 (+/- 0.2) has been regarded as a statistical (probabilistic) definition of a biological species (Thackeray, 2007).

When Stw 53 is compared pairwise with the other hominins, it is possible to calculate a mean log sem value for all pairwise comparisons, recognizing that Sts 5, Sts 71, OH 24 and KNM-ER 1813 may represent a chronospecies within the period 2.6 – 1.6 Mya (Thackeray, 2016).

We present here the results of comparisons with Stw 53 on the x axis:

Stw 53 vs KNM-ER 1813	-1.312 (71 measurements in common)
Stw 53 vs Sts 5	-1.300 (76 measurements in common)
Stw 53 vs Sts 71	-1.293 (54 measurements in common)
Stw 53 vs OH 24	-1.322 (59 measurements in common)

Here we present here the results of comparisons with Stw 53 on the y axis:

KNM-ER 1813 vs Stw 53	-1.230 (71 measurements in common)
Sts 5 vs Stw 53	-1.241 (76 measurements in common)
Sts 71 vs Stw 53	-1.205 (54 measurements in common)
OH 24 vs Stw 53	-1.231 (59 measurements in common)

The mean log sem for these regression equations is -1.267 (+/- 0.042), for 8 regression equations. This is just within the upper 95% confidence limit for Stw 53 being conspecific with the other four specimens. One way to interpret this result is that Stw 53 represents part of the process of a transition between *Australopithecus* and *Homo*, relating to the concept of a chronospecies (Thackeray, 2016).

We thank Brendon Billings (School of Anatomical Sciences, Wits) for making measuring instruments available. The cast of Stw 53 (as reconstructed by Ron Clarke) was obtained from the University of the Witwatersrand (personal collection of Francis Thackeray).

Thackeray, J.F. 2007. Approximation of a biological species constant? South African Journal of Science 103:489.

Thackeray, J.F. 2016. Homo habilis and Australopithecus africanus, in the context of a chronospecies and climatic change. In: Runge, R., (ed.) Changing climates, ecosystems and environments within arid southern Africa and adjoining regions. Palaeoecology of Africa 33:53-58
http://www.routledge.com/books/search/author/juergen_runge

News from Francis

By Francis Thackeray
ESI, Wits University

In November 2016 I travelled to France and Germany. In Toulouse I met Jose Braga together with Jean-Michel Loubes (mathematician). We explored the approximation of a biological species constant ($T = -1.61 \pm 0.1$) based on morphometric analyses of primate crania, in the context of hominins and the two species of chimpanzees (which are now known to have been interbreeding within the last million years). In Paris I met Dominique Gommery, Frank Senegas, Sandrine Prat, Brigitte Senut, Martin Pickford, Henri and Marie-Antoinette de Lumley, Christophe and Chafika Falgueres, Emmanuelle Honore (now based in Cambridge) and many others associated with palaeontology and archaeology. I gave lectures at the Musee de l'Homme and at the IPH (Institute for

Human Evolution). It was all very stimulating. In Germany I was invited to deliver the 15th Ralph von Koenigswald lecture at the Senckenberg Institute (one of the best institutes of its kind in the world!). The subject was "*The definition of species in human evolution*", and attracted a great deal of interest. At the invitation of Friedemann Schrenck and Ottmar Kullmer, I gave the lecture in the largest gallery (which included a whale skeleton, a mammoth and other large beasts, with enough room for more than 400 people. The lecture was followed next day by a colloquium on "*How to define a species*", held at the Werner Reimers Institute. It was again, all very stimulating and productive!

Exciting excavations continue at Kromdraai with Jose Braga, Laurent Bruxelles, Jean-Baptiste Fourvel and others, as part of the KRP (Kromdraai Research Project). We are pleased to report that a book has just been published (Braga and Thackeray, 2016) entitled "*Kromdraai, a birthplace of Paranthropus in the Cradle of Humankind, a South African world heritage site*". If anyone would like to obtain a copy, please contact either Jose (jose.braga@univ-tlse3.fr) or myself (francis.thackeray@wits.ac.za). The foreword of the book has been written by Bob Brain (we extend our sincere condolences to him and his family, on the death of Laura Brain whose cheerful laugh we will always remember). Bob undertook important exploratory work at Kromdraai more than 50 years ago, prior to excavations by Elisabeth Vrba and Tim Partridge, later extended by myself with Jose and our team. It turns out that the Kromdraai site is much more extensive than previously thought and more hominins are being found, now that a large sterile deposit has been removed. Sue Dykes, Julien Benoit and I have been working on an exciting project

which involves the use of both "log sem" and UPGMA to obtain phenetic trees for Early Pleistocene African hominins, and extant chimpanzees. Watch this space!

Other projects relate to lichen, manganese dioxide and *Homo naledi*; climatic change; and the ongoing investigation of the "Piltdown Case". I have identified a new suspect (Edgar Willett) who is known to have been at Piltdown and who may have been assisted (in a joke directed against Charles Dawson) by Teilhard de Chardin - at least that is a scenario presented by myself in the South African Journal of Science. The "Piltdown Case" is most certainly not closed.

2016 for the HRU and Bolt's Farm team

By Dominique Gommery & Francis Thackeray
Centre de Recherche sur la Paléobiodiversité et les
Paléoenvironnements, Paris, France & ESI, Wits
University

2016 was a busy year for the HRU and the Bolt's Farm team with two fieldwork seasons at the Bolt's Farm Cave System (or BFCS). The core of the HRU team is represented by Dominique Gommery and Frank Sénégas (CR2P) with Lazarus Kgasi and Stephany Potze (Plio-Pleistocene Palaeontology Section from the Ditsong National Museum of Natural History). S. Potze participated only on the first season before she left South Africa for an exciting new position in USA (La Brea Tar Pits Museum, Los Angeles). We wish her well in America.



Happy diggers:
Excavation at Milo
A (BFCS) during
the first fieldwork
season with the
students from
UNISA

In collaboration with the Department of Anthropology and Archaeology of UNISA (Jan Boeyens and Francois Coetzee), 8 students (A. Botes, C. Clark, J.-M. Comhaire, H. Griesel, I. Meyer, S. Pearlman, C. Steyn & E. Winter) took part in the fieldwork at BFCS during the first season, and 1 student (C. Clark) joined the second. Nonhlanhla Vilakazi continues to study of small reptiles from BFCS and participated in the first season. At the beginning of August 2016, she was appointed as a researcher in the Department of Anthropology and Archaeology of UNISA (congratulations to her). Brian Kuhn (Department of Geology, University of Johannesburg) participated in the two seasons of excavations and is excited by the large carnivores from BFCS.

During his research trip in South Africa, Timothy Campbell (PhD student, Texas A&M University, USA) participated in the first season at BFCS. Loïc Ségalen (UPMC-Paris) and Julie Aufort (PhD student at UPMC-Paris) excavated at Aves Cave I (BFCS) during the second

season. L. Ségalen is one of three PhD supervisors, involved with the study of diagenetic processes at BFCS. Andy Herries (La Trobe University, Australia) and his students, Brian Armstrong and Tara Edwards, have continued their geochronological and geological studies at BFCS. We invite you to read the recent publication of the HRU team which concerns the fossil suid remains from Aves Cave I, by Martin Pickford and Dominique Gommery (<http://estudiosgeol.revistas.csic.es/index.php/estudiosgeol/article/view/952/1113>). Francois Coetzee organized an exhibition on BFCS (Past Environments and Fossils at Bolt's Farm, Cradle of Humankind) at the Museum of Anthropology & Archaeology of UNISA (Pretoria). The official opening was on the 13th of May 2016 (<http://www.ambafrance-rsa.org/Opening-of-the-Bolt-s-Farm-palaeontological-exhibition> & <http://www.southern-africa.cnrs.ird.fr/all-news/news-in-southern-africa/the-unisa-museum-of-anthropology-archaeology-invites-you-to-the-opening-of-the-bolt-s-farm-palaeontological-exhibition>).

In September 2016, the NRF obtained funding for the South African part of the LIA HOMEN project (LIA = Associated International Laboratory in collaboration with the CNRS (French National Centre of Scientific Research); HOMEN = Hominids and Environments: Evolution of Plio-Pleistocene Biodiversity) coordinated by F. Thackeray, with D. Gommery who is in charge of the French part of the project. Francis was in France in November 2016 for administrative meetings with Dominique about the LIA project, and also delivered lectures at the IPH (Institute for Human Prehistory) and at the Musée de l'Homme. Between the 22nd of November 2016 and the 7th of December 2016, Nonhlanhla Vilakazi (Department of Anthropology and Archaeology of UNISA) and Lazarus Kgasi (Plio-Pleistocene Palaeontology Section from the Ditsong National Museum



The team: (left) HRU and Bolt's Farm team during the opening of the exhibition at UNISA (from right to left: Nonhlanhla Vilakazi, Dominique Gommery, Angelique Botes, Lazarus Kgasi, Francis Thackeray & Frank Sénégal). (right) Lazarus Kgasi and Nonhlanhla Vilakazi during one week-end at Paris.

of Natural History) came to the National Museum of Natural History (MNHN) in France with LIA funding from the NRF. L. Kgasi received an intensive specific training in photography for palaeontology at the CR2P. He was also trained in fossil preparation techniques, data basing and curation. N. Vilakazi accessed the osteological collection of small reptiles at the MNHN (comparative anatomy) and she studied different groups of snakes and lizards from Southern Africa but elsewhere in Africa. She participated in the training courses in data basing and fossil curation. It was a great opportunity for them to meet French colleagues and share their experience. For example, N. Vilakazi had extensive discussions with two French specialists on small reptile fossils, Jean-Claude Rage (CR2P) and Salvador Bailon (UMR 7209 Archéozoologie et Archéobotanique). The funding for the LIA HOMEN

project permitted Teresa Kearney (Small Mammals Section of the Ditsong National Museum of Natural History) to purchase a high-performance stereomicroscope which will facilitate the study of fossil microfauna from the Bolt's Farm Cave System. It will be used by Teresa and other members of the HRU and the Bolt's Farm team. Brian Kuhn (Department of Geology, University of Johannesburg) will come to France between the 1st and 15th of February 2017 associated with the LIA project. With Dominique, he will go to Lyon and Burgundy to study large carnivores for comparison with those of the Bolt's Farm Cave System discovered by the HRU team.

The LIA HOMEN project is dynamic and exciting!

ESI Outreach News

By Ian Mackay
ESI, Wits University

2016 was an incredibly busy year for our palaeosciences outreach programme. We had very successful exhibitions at the Grahamstown Science Festival, Rand Show, Yebo Gogga Exhibition, Zulu Fest (Richards Bay), and Sci-Bono Science Centre. We held hands-on workshops about human evolution in and around Taung, and in collaboration with a local radio station (Waltha FM) and an NGO called Jive Media, had learners record songs, complete with musical backings. Their original songs had to be related to the theme of the of "Taung as a World Heritage site which is part of the Cradle of Humankind". Kenya, and the first ever South African workshop in education and outreach for Palaeoscience Public Engagement, Outreach and Education Practitioners

(PPEOEPs), we also had workshops on human evolution for 202 Gauteng Department of Education, Grade 12 teachers. We conducted the first ever survey of palaeoscience engagement, outreach and engagement in South Africa and set up many fruitful projects and collaborations for the future, one of these being a glossary of Palaeoscience Terms in some of our major local African languages. With the assistance of one of our partners "The Dinosaur Alive Exhibition" we even had small exhibitions in Kitwe and Lusaka in Zambia. We also collaborated with the Origins Centre, and National Health Laboratory to provide information on MtDNA testing for people interested in determining their ancestry. Our total audience reach for 2016 was 37526 which is a record for this outreach programme.

Many thanks to Amanda Mudau, Mirriam Tawane and every single person who participated and helped to make the outreach programme a success.

Kitching Fossil Exploration Centre (KFEC)

The KFEC had another very successful year, managing to attract 4962 visitors, which in our financially stressed times is an excellence performance. This success can be attributed to an enthusiastic voluntary board, a productive partnership with the nearby Owl House and a hardworking staff consisting of Sydney Norman, Gerrit Baard, Melanie Bowkers, and Andries Tromp. The KFEC is almost at the point where it is financially sustainable. If it attains this status it will be one of the few Palaeotourism Organisations in South Africa to have done so.

Conferences 2017

2006, London (United Kingdom) in 2010 and Mendoza (Argentina) in 2014, it will convene in Paris (France) in 2018.



THE 5TH INTERNATIONAL PALAEOLOGICAL CONGRESS

July 9th - 13th, 2018
FRANCE

THE FOSSIL WEEK

INVITATION

On behalf of the Organising Committee, we are particularly pleased to invite you to France for the fifth edition of the International Palaeontological Congress, the IPC5.

Under the auspices of the International Palaeontological Association (IPA) and with the participation of the whole French Palaeontological community, "the Fossil week" will be organized in 2018 in Paris, July 9th-13th.

This event is a unique opportunity for our community to present its new results and discuss all aspects of our discipline.

We propose here some possible symposia and sessions. Of course, the list is provisional and it is still completely open. We are waiting for your proposals.

Fieldtrips are planned before and after the congress throughout France, Belgium and Italy. They will give you the opportunity to discover our palaeontological, geological and gastronomic heritages.

We hope to welcome many of you in France in 2018.



© Paris Tourist Office - Daniel Thewy

View of the Seine River and the Notre-Dame Cathedral

VENUE

The meeting will take place in the Pierre & Marie Curie University and in the National Museum of Natural History, both located in the 5th arrondissement, in the center of Paris, along the left bank of the Seine River. This district is commonly known as the *Quartier Latin* because it is where the first great Parisian university, the Sorbonne, was founded, and because Latin was the language of scholars at the time. The 5th arrondissement was also the core of Lutetia, the antique city of Paris, as revealed in a number of archaeological sites.



Map of 5th arrondissement

The most famous building of the 5th arrondissement is probably the Pantheon, where graves of influential French personalities are clustered, but there are many other noteworthy sights, such as the magnificent Val-de-Grâce Church, the intriguing St-Etienne-du-Mont Church, the Cluny Museum, the Roman Arènes de Lutèce and the city's botanical garden, the Jardin des Plantes, surrounding buildings of the National Museum of Natural History. This institution housed one of the largest collections of natural objects of the world with more than 68 million specimens.

The palaeontology collection itself contains between 5 and 6 million specimens.



© Urban Caper

Jardin des Plantes



© Paris Tourist Office

The opening plenary session will take place in "La Maison de la Mutualité". During its 80 years of existence, this building has hosted many historical events and welcomed prominent personalities: it is where Charlie Chaplin recorded the music for some of his movies; among world-class singers, Edith Piaf, Jacques Brel and Léo Ferré performed there.

ACCOMMODATION

With more than 2,000 hotels, Paris provides visitors with stylish options at all price ranges. Bed & Breakfasts, youth hostels and furnished apartment rentals complete the wide accommodation offer. Conference participants have to make their own accommodation arrangements.

RESTAURATION

Paris, known as the Capital of Gastronomy, invites travellers from all over the world to have a feast! The art of French cooking owes its success to the mastery of classic basils updated by today's chefs. The city has the second highest number of Michelin-recommended restaurants in the world. Besides notorious haute-cuisine temples, Paris is replete with informal cafes, eccentric wine bars, vintage bistros, and the new bistronomies, serving affordable modern cuisine in a casual setting. Finding baguettes of unrivalled crispness is no challenge here. All sorts of world cuisines are also well represented.

ORGANIZATION

The organizing structure is the CR2P (Centre of Research on Palaeobiodiversity and Palaeoenvironments - paleo.mnhn.fr). This laboratory is composed of lecturers and professors from the MNHN (National Museum of Natural History) and the UPMC (Pierre & Marie Curie University – Paris 6) and of researchers from the CNRS (National Scientific Research Center). Altogether the CR2P includes 41 tenured scientists, 27 postdocs and PhD students, and 27 engineers, technicians and administrative staff. This makes it one of the largest research laboratories in the world exclusively devoted to Palaeontology. The French Geological Society (SGF) will support the congress organization.

General chair

Sylvie Crasquin

Secretary general

Angelina Bastros and Stéphane Peigne

General management

Gael Clément, Michel Laurin, Isabelle Rouget and Brigitte Senut

Communication

Sophie Fernandez, Damien Germain, Florent Goussard and Adeline Kerner

Field trips

Ronan Allain and Patrick De Wever

Scientific chairs

Olivier Bathoux, Sylvain Charbonnier, Emmanuel Gheerbrant, Didier Merle and Annachiara Bartolini

Palaeontologists from other institutions in France (Universities of Bordeaux, Brest, Burgundy, Lille, Lyon, Montpellier, Nantes, Poitiers, Rennes, Toulouse and the regional Natural History Museums) are involved with the organization of both fieldtrips and symposia.

The Fossil Week meeting will take place from the 9th to the 13th July of 2018. This will allow conveners to extend their stay to enjoy the festivities relating to the French National Day, July 14th. The weather is pleasant during summer time, with an average of 25°C (77°F).

TRANSPORTATION



Paris has daily connections with more than 526 cities in more than 136 countries via its international airports, namely Paris - Charles-de-Gaulle (23 km northwards; commuting time 45-60 minutes by city train) and Paris - Orly (14 km southwards; commuting time 30-40 min by city train).

With seven train stations in Paris itself, the city is at the heart of an exceptionally comprehensive and high-performance rail network. On a daily basis, 425 high-speed trains connect various destinations across Europe with the French capital. French regions (Alsace, Burgundy, Brittany, Champagne, etc.) can be reached in a few hours from Paris, thanks to this well-developed transportation network and its central position in France.

Paris is equipped with top-class infrastructures and, in particular, a dense and versatile transportation network, in which the subway, bus, tramways, taxis, "vélib" (the city's bike sharing scheme), and now the "autolib", are interlinked.

Participants who require a support letter for visa application are invited to contact the organizing committee (congress-ipc5-contact@mnhn.fr). This letter does not imply any financial obligation on the part of the Congress organizers.

SCIENTIFIC COMMITTEE

Honorary scientists

Philippe Taquet	French Academy of Sciences
Philippe Janvier	French Academy of Sciences
Yves Coppens	French Academy of Sciences
Armand de Riquès	Pierre & Marie Curie University

International representatives

Lucia Angiolini	Milano, Italy
Marion Bamford	Johannesburg, South Africa
Spela Gorican	Ljubljana, Slovenia
David A.T. Harper	Durham, UK
Dieter Korn	Berlin, Germany
John Long	Adelaide, Australia
Rossana Martini	Geneva, Switzerland
Harufumi Nishida	Tokyo, Japan
Guntupalli V. R. Prasad	Delhi, India
Claudia V. Rubinstein	Mendoza, Argentina
Paul Sereno	Chicago, USA
Blaire Van Valkenburgh	California, Los Angeles, USA
Zhonghe Zhou	Nanjing, China

French region scientists

Pierre-Olivier Antoine	Montpellier University
Loïc Bertrand	IPANEMA, SOLEIL, Saclay
Eric Buffetaut	CNRS, ENS Paris
Bruno Maureille	CNRS, Bordeaux University
Brigitte Meyer-Berthaud	CNRS, Montpellier University
Pascal Neige	University of Burgundy
Didier Néraudeau	Rennes University
Thomas Servais	CNRS, Lille University
Jean Vannier	CNRS, Lyon University

Local representatives

Sylvie Crasquin	CR2P, Paris, France
Stephane Peigne	CR2P, Paris, France

PRESENTATIONS AND LANGUAGE OF THE CONGRESS

Detailed instructions for duration of regular talks and for preparation of posters and talks will be given in the second circular.

English will be the official language of the meeting and excursions.

Abstracts: collected abstracts will be published on-line and made available on memory sticks to all participants. It is also planned to publish symposium proceedings in reputable journals.

SYMPOSIA

The Plenary opening session ceremony will take place at the Mutualité; it will include some invited talks. The scientific sessions will be organized in parallel on Pierre & Marie Curie University Campus and in the Jardin des Plantes amphitheatres. All these places are separated by less than 500 m.

Saturday July 8th	Monday July 9th	Tuesday July 10th	Wednesday July 11th	Thursday July 12th	Friday July 13th	Saturday July 14th
	Registrations Plenary opening session	Scientific sessions	Free day or Workshops Mid-congress fieldtrips	Scientific sessions	Scientific sessions	French National Day
Registrations	Scientific sessions	Scientific sessions	Free day or Workshops Mid-congress fieldtrips	Scientific sessions	Plenary closing ceremony and IPA session	
IPCS rockfall diatetra			Gate dinner			

Some scientific sessions have already been proposed by the French palaeontologists and are listed below. We call here for other proposals.

All the palaeontological groups have their own meetings, so please do not propose session too much focused on taxa. The IPC is the opportunity to mix the different group approaches.

- African Vertebrate Palaeontology
- Angiosperms, from the beginning to their diversification
- Back to the sea: from Late Palaeozoic to Cenozoic, the marine tetrapod adventure
- Biodiversity changes through times: crisis and radiations
- Biomineralisation and life
- Bird evolution
- Data, dispersals and interchanges through time: a land mammal perspective
- Databases in palaeontology: sharing knowledge for leveraging research options
- Early Life: origin, triggers and diversification
- Evolution of Indo-Pakistan biotas from the break-up of Gondwanaland (Late Jurassic) to the initiation of the collision with Eurasia (Eocene): between vicariance and dispersals
- Evolution of trees and forests
- Fossil 2D/3D imagery: approaches, advances, management
- Fossils & Recent, Molecules & Morphology: dialogs between the approaches
- Fossils and stratigraphy: an old but still dynamic symbiosis
- Intimate interactions
- Konservat-Lagerstätten
- Macroecology and the fossil record
- Microorganism evolution and interaction with biogeochemical cycles and climate
- Neogene environments
- Palaeontology and geological heritage
- Palaeozoic seas: from deep to shallow
- Practical micropalaeontology (including palynology)
- Timetrees
- XXIst Century palaeohistology of mineralized tissue.

Send your proposal to congress-lpc5-contact@mnhn.fr before May 31st, 2017.

A proposal should include:

- Name of conveners
- Symposium title
- Paragraph explaining the scope and importance of the symposium

SHORT COURSES & WORKSHOPS

Some short courses and workshops will be organized during the congress. Additional information will be available in the second circular.

MID-CONGRESS EXCURSIONS

- Survey of the MNHN Collections (only through early request).
- Field trip to underground quarries at Meudon
- Guided geological walks inside Paris
- One-day visit at IPANEMA, SOLEIL synchrotron, Saint Aubin, Paris Region
- The Cenozoic of the Southern Paris Basin
- Visit of the "Centre de Recherche pour la Conservation des Collections" (MNHN)

FIELD EXCURSIONS

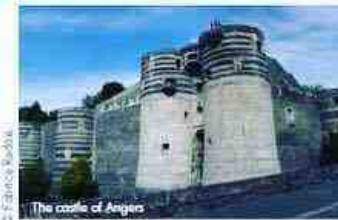
Paris will allow all participants to enjoy *the French art de vivre*. In addition to Paris and its vicinity, field excursions will offer the opportunity to (re)discover many aspects of France and of Belgium and Italy.

France is unique for the outstanding richness and importance of its fossil localities, all easily accessible, with all periods of the Phanerozoic geological time represented. Some of the earliest geological maps were produced here by Cuvier and Brongniart, and many stratotypes (Cenomanian, Givetian, Lutetian, Turonian, etc.) are located here.

Among the most famous Konservat-Lagerstätten are those of Montceau-les-Mines (Late Carboniferous), La Voulte-sur-Rhône (Middle Jurassic), and the Cenozoic sites of Colron and Sansan. The best European Palaeocene terrestrial fossil localities are found near Reims. Cretaceous sites in Charentes provides dinosaurs as well as fossils in amber. Recently, geological reserves or geological parks were created, sometimes associated with stratotypes. Among them are Saucats-La Brède (Aquitanian), Digne-les-Bains (Barremian, Aptian), Hettange-Grande (Hettangian), Pointe de Givet (Givetian), Sainte Victoire mountain, etc. These constitute a number of attractive spots for geologists and palaeontologists.

We propose here pre- and post-congress fieldtrips.

Participants will enjoy a unique experience in palaeontological journeys that will be exquisitely combined with gastronomical, artistic or historical adventures!



© Francis Bolya

• Anjou noir, Anjou blanc, Anjou rouge: paleontology and geology of the Loire Valley
4 days

• Excavations at the Early Cretaceous Dinosaur Bonebed of Angeac-Charente
5 days

• Geology, wine and culture: Jura, Bourgogne and Champagne
6 days

• Jurassic from Normandy
2 days

• Jurassic from Northern Burgundy to Lyon area: fossils, wine and patrimonial aspects
4 days

• Le Regourdou (Dordogne) : "the cave of the Neandertal Man who saw the bear"
2 days

• Luberon & Haute-Provence palaeontological sites (Southeast France)
5 days

• Mid-Late Palaeozoic of western Europe : the Belgian Classics
3 days

• Montceau-les-Mines Lagerstätte (Carboniferous) and Autunian Stratotype (Permian)
2 days

• Permian and Mesozoic environments in southern France
5 days

• The end-Permian mass extinction and the Early Triassic biotic recovery in the Dolomites (Southern Alps, Italy)
4 days

• The Late Jurassic dinosaur trackways from Jura
5 days



© Marie Toussaint, S. Miller



© Christine Connolly Brusa



© Global Geoparks network

SOCIAL PROGRAM

IPCS "cocktail dinatoire" will be organized on Tuesday 10th evening in the Great Gallery of Evolution in the National Museum of Natural History. The Gala diner will take place on Thursday 12th evening.



REGISTRATION

The registration fees will include the Tuesday evening cocktail, the coffee breaks and the conference documents. The Gala Dinner is optional; additional information and price will be in the second circular.

Refund of registrations fees will be subject to conditions. Details will be given in the next circular.

	Full registration	Students
September 1st to December 31st, 2017	360 €	200 €
From January 1st to March 31st, 2018	460 €	290 €
From April 1st, 2018 to June 30th, 2018	560 €	380 €

TRAVEL GRANTS

The organizing Committee is looking for corporate and governmental sponsorships in order to get travel grants for students. Additional information to apply will be in the next circular.

Our delegates are advised to take out their own private medical and personal insurance for the duration of the Congress and field excursions.

IMPORTANT DATES:

- Second circular: Spring 2017
- Call for symposium topics before May 31st, 2017
- Opening of registration: September 1st, 2017

contact : congress-lpc5-contact@mnhn.fr

Organisers



Administrative supervision



MUSÉUM
NATIONAL D'HISTOIRE NATURELLE



UPMC
1001 GORDONNE UNIVERSITY



Partners



MUSÉUM
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NATURELLE
de Toulon et du Var





We cordially invite oral and poster presentations dealing with all aspects of continental ichnology to be presented at the **2nd International Conference of Continental Ichnology in Cape Town and West Coast (Windstone Farm), South Africa.**



Venue(s)

1. Conference workshop and Icebreaker Party (1st October):
University of Cape Town (Upper Campus) - www.geology.uct.ac.za
Located 35 mins drive from the Cape Town International Airport.
2. Conference venue (2 - 4th October):
Windstone Farm - www.windstone.co.za
This venue is situated ~1 hr drive from Cape Town, and 5 minutes' drive to the West Coast Fossil Park (www.fossilpark.org.za).
NOTE: We will be traveling to the venue as a group at the end of the Icebreaker Party.
Departure: 19:00hrs on 1st October from UCT Upper Campus.

Critical dates

15 March	Abstract submission closes
31 March	Final notifications to authors on their abstracts
15 May	'Early-bird' registration & Field Trip bookings close
31 August	Standard registration closes
1 October	On-site registration, UCT Upper Campus
1 October (9 am)	Photogrammetry Workshop: affordable techniques @UCT Upper Campus (details on the programme to be announced later)
1 October (4 pm)	Icebreaker Party @UCT Upper Campus
1 October (7 pm)	Group travel to ICCI2017 venue @Windstone
2-4 October	Talks & posters @Windstone
4 October	Gala & awards dinner @Juffroushoofte Guest Farm
5-8 October	Field trip (ends @UCT Upper Campus, late pm on 8 th October)

Meals

In addition to the venue for the talks and posters, all meals for all participants will be provided at Windstone (and included in the registration fee). Please contact us via email if you have special dietary needs (for daily meals and gala dinner too).

Accommodation

For students:

Accommodation will be included in the registration fee and provided at Windstone (see link below). This is dormitory style accommodation in multiple bunk beds with no linen.

Please BRING your sleeping bag.

For regular delegates:

Accommodation for regular delegates is NOT included in the registration fee.

There are 3 options:

Option 1: Windstone Farm - www.windstone.co.za

GPS coordinates: 32° 56' 40.6"S 18° 5' 46.7"E

A limited number of shared accommodation is available at the conference venue at very reasonable prices in 6 units for maximum 28 people.

Please contact Windstone directly (and mention ICCI when you book & pay).

First come, first served.

Option 2: Juffroushoogte Guest Farm - www.juffroushoogte.co.za

GPS coordinates: 32°55'52"S 18°04'01"E

Please contact Juffroushoogte directly (and mention ICCI when you book & pay).

See the 2017 rates here: <http://www.juffroushoogte.co.za/wordpress/wp-content/uploads/2017/01/Juffroushoogte-Rates-2017.pdf>

First come, first served.

Note: Juffroushoogte is ~5 minutes' drive from Windstone, and complimentary ICCI transport will be provided to Windstone twice daily.



Option 3: Langebaan - www.langebaan-info.co.za

The town of Langebaan offers accommodation for various budgets. However, it is a commute of ~35 minutes from Windstone and delegates would need to arrange their own transport daily.

Cost

We are trying hard to get as many sponsors on board as possible to make this event affordable for all our colleagues. Please bear with us and check the webpage again soon!

We are currently **undermaning** but the regular registration fee will be ~150 US\$ (early bird fee ~900 US\$).

Registration fee will include the costs of the icebreaker party, welcome pack, workshop participation, all meals and coffee breaks, gala dinner, transport to Windstone on the 1st October (and back to Cape Town on the 5th) as well as intra-conference fieldtrip to the West Coast Fossil Park - www.fossilpark.org.za



Funding

Only available to IAS student members. Please apply for the travel grant directly through the IAS webpage: www.sedimentologists.org.
Subscribing student members need to log into the IAS webpage and proceed with the application from their member profile.

Please carefully read and check the requirements first.

Post-Conference Field Trip



This will be the highlight of the ICCI 2017 and we encourage you to attend. In addition to ichnology, the key points on the geology of the Karoo Basin and Cape Fold Belt will be presented.

Maximum number of participants is 40.

Please book early so that we can plan accordingly. The cost of the trip will be a separate charge from the registration fee.

First departure: 7:30 am 5th October, from Windstone Farm (West Coast)

Last arrival: late pm 5th October, @UCT Upper Campus (Cape Town)

Note: Please do not book early evening flights on the 5th October, because we will be travelling long distances on road (see below) and our bus might only get back to Cape Town late on that evening. If you can, rather spend another day in Cape Town – so much to see, so little time...

P.T.O. for the preliminary program.

Please visit the website for updates & more information:

<https://sites.google.com/site/icci2017conference/post-conference-field-trip>

Day 1 - 5th October, Thursday
Highlight: Middle Permian tetrapod track site (Fraserburg) & geology of the Karoo Basin
Route: Windstone → Graaff-Reinet [total travel distance: ~900 km]

Day 2 - 6th October, Friday
Highlight: Early Triassic vertebrate burrow sites & Permian-Triassic Boundary section (Craddock, Burgardorp)
Route: Graaff-Reinet → Burgardorp or Aliwal North [total travel distance: ~350 km]

Day 3 - 7th October, Saturday
Highlight: Jurassic track sites & Triassic-Jurassic Boundary section in SW Lesotho (Quthing); Ellenberger's Moyeni site & his family home at the Mantise Cave House Museum
Route: Aliwal North/Burgardorp → Lesotho → Aliwal North [total travel distance: ~350 km]

Day 4 - 8th October, Sunday
Highlight: geology of the Karoo Basin & Cape Fold Belt
Route: Aliwal North → Cape Town, Upper Campus UCT [total travel distance: ~1000 km]



For an interactive map, please visit the ICCI 2017 webpage.

Note that the planned daily travel distances are long, and for safety reasons (e.g., wild animals roaming), we will have to avoid driving after sunset (except for the last day on the national road). Therefore participants can expect early departures and late arrivals daily. Accommodation and meals will be provided by various establishments in Graaff-Reinet and Aliwal North. We will provide drinks: bottled water, tea, coffee but not alcohol. Remember to bring your personal thermos flask/cup for tea/coffee (see website for other items).

Local organising committee

- | | |
|--------------------|----------------------|
| 1. Emese Bordy | 8. Bianca Harrison |
| 2. Lara Sciscio | 9. T'Nelle Harpe |
| 3. William Krummke | 10. Claire Geol |
| 4. Mingshi Abraham | 11. Yambi Dumi |
| 5. Sandra Spelman | 12. Maphahle Mokhele |
| 6. Mhairi Reid | 13. Akhil Rampersad |
| 7. Robert Muir | |

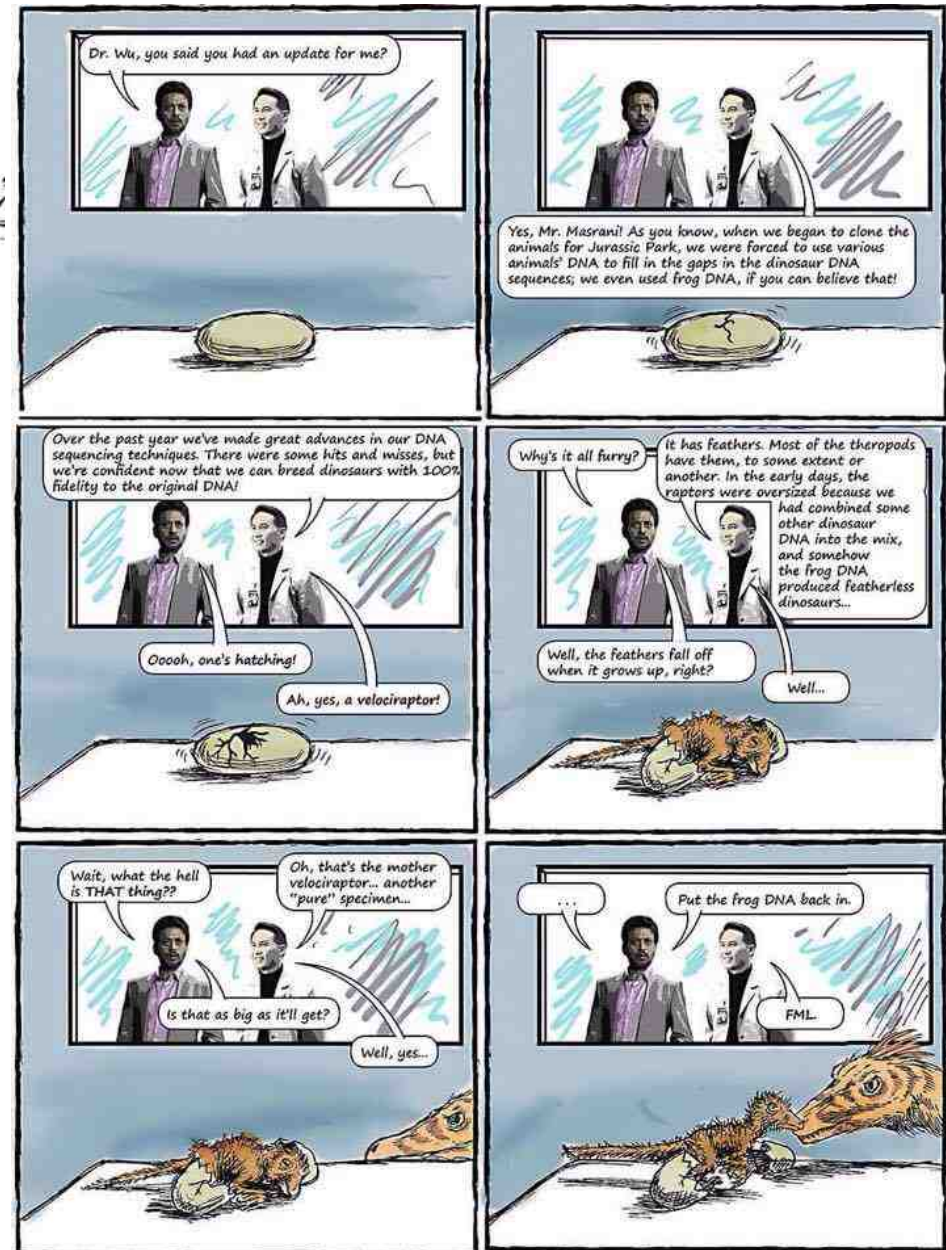
Please contact us on: ICCI_2017@yahoo.com

Visit our WEBPAGE at:

<https://sites.google.com/site/ici2017conference/home>



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Publication lists

From the UCT Palaeobiology Lab

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