

2017

Course Report



REPTILE DIVERSITY in 
 AFRICAN SAVANNAS

www.studyafrikanreptiles.org

Our Sponsors & Partners

Thank you for providing a once in lifetime experience for our students. RDAS is an independently run course and its success depends on the generosity of our donors and partners. We could not put together such an experience without your help. We hope that you will continue to partner with us in the future. Thank you for your commitment to developing human capacity, education, and research in South Africa.

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Our Mission

Education through Experience

The Reptile Diversity in African Savannas field course (RDAS) exists to provide South African students with the opportunity to experience and interact with intact African savannas and their associated biodiversity. RDAS aims to empower deserving students from disadvantaged backgrounds who would not otherwise have the opportunity to visit large formally protected areas.

Students in the faculty of life sciences are the future conservation biologists, managers, consultants, and educators. RDAS was created, in part, to encourage students to understand, appreciate, and study reptiles, a group of organisms that are often ignored. To date, few studies have focused on reptiles and as a result there is a gap in the number of people who are trained to study this underappreciated and stigmatized taxon.

More broadly, RDAS provides an outdoor classroom, rich in hands-on learning and field research to upskill and enlighten budding scientists. Through the hard work of our students, RDAS aims to collect data yearly which will contribute to our understanding of reptile diversity and community composition across the landscape. Ultimately, RDAS aims to support the development of skilled human capital in South Africa through a two-week field course focused on herpetology. To our knowledge, RDAS is the first course of its kind in all of Africa.



Opportunity

RDAS

Research

Education

RDAS 2017 Highlights

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In December 2017, the 1st annual Reptile Diversity in African Savannas field course (RDAS) was held in the Kruger National Park. RDAS is an independently-run field course created by Dr Bryan Maritz, a senior lecturer at the University of the Western Cape, to enhance the lives and education of deserving students. For two weeks, 10 students and four staff members called Skukuza home and embraced all that Kruger has to offer.

The cohort of students was a diverse mixture of first, second, honours, and masters students from the University of the Western Cape, University of Mpumalanga, and University of Venda. Most of our students are first-generation university students, a praise-worthy endeavour. Our students are passionate about biology and have a range of career aspirations including owning a nature reserve, owning an animal hospital, conducting conservation research, and pursuing an academic career. Unified by RDAS, students from different background shared a once in a lifetime experience.

The small student-to-staff ratio offered students the opportunity to receive

“I grew up having the opportunity to visit the Kruger National Park during family holiday visits and I have little doubt that it played a critical role in me becoming a biologist.”

-B. Maritz, RDAS founder

have lengthy discussions, and to participate in hands-on activities that could not be done in a larger class setting. Leading the course was Bryan Maritz (UWC), Graham Alexander (Wits), Donovan Tye (OTS), and Robin Maritz (RDAS manager).

For the duration of the course, the Skukuza Science Center, owned by the Skukuza Science and Learning Initiative, acted as our base camp. The brand-new facility catered to our needs perfectly by providing accommodation, catering, a well-stocked library, a lecture venue, and laboratory space, and, importantly, a savanna landscape.

15 DAYS

10 STUDENTS from

3 UNIVERSITIES

1 EXPERIENCE OF A LIFETIME



UNIVERSITY OF
MPUMALANGA



UNIVERSITY of the
WESTERN CAPE



University of Venda



The beauty of staying in the heart of the savanna is that animals are all around. One afternoon, Bryan heard a white-browed robin-chat and a dark-capped bulbul alarm calling incessantly. Because birds and their chicks fall victim to snakes and other predators frequently, alarm calling is a good sign that there could be a snake nearby. Taking a cue from the birds, Bryan began inspecting the bush for a possible instigator. Very quickly Bryan spotted why the birds had been frantic—a black mamba (*Dendroaspis polylepis*). Black mambas are highly-venomous and can reach lengths of 3 metres resulting in them being the most feared snake in all of Africa. A mamba in camp—how exhilarating for everyone involved!

The message spread quickly that we had a visitor in camp and everyone rushed over to catch a glimpse of the notorious snake. There is a time and a place for wrangling a snake but in this instance, there was no need. We made sure to give the snake ample space and watched as it slithered through the bush inspecting the terrain. Even with ample space, it was very aware of us and fled when it had the opportunity. For the two dozen spectators, the experience highlighted that black mambas are not out to get humans. They are organisms that traverse their habitat looking for resources and evading predators. The sighting truly encompassed the mission of RDAS: education through experience.

Beyond the fence that surrounded our base camp are some large charismatic characters: lions, buffalo, elephants, leopard, and rhino. Conducting research and being on-foot requires attentiveness and the assistance of a well-trained—and armed—game guard. The focal research project required checking traps across six sites every morning and evening. Voyages on the game drive vehicles to the study sites produced antelope, buffalo,



lion, and elephant sightings, but the large mammals seemed to be absent from our field sites—until one morning when an elephant herd arrived.

Everyone froze and hushed immediately, then looked to Thomas, our game guard, for instruction. The thing about elephants is that they are large and rarely solitary, and when surrounded by a sea of trees and shrubs they become invisible until an elephant appears only a few hundred metres away. At least two elephants passed us on our left side before we made it safely to the road and toward our vehicle. Suddenly, two more elephants appeared from within the bush and were square between us and the vehicle. Eventually, we were safely back on our vehicle and could breathe a sigh of relief. The encounter reminded everyone that bush is alive and provided a memorable experience bound to last a lifetime.



The award for most exquisitely coloured reptile seen on the trip goes to the Eastern Tiger Snake (*Telescopus semiannulatus*). We found the individual while searching for nocturnal animals around Skukuza Rest Camp one evening. The sun had set requiring us to use torch light to scan for critters. As we walked along the path neighbouring the Sabie River, someone's torch light illuminated the tiger snake hugging the adjacent wall. We watched as it slithered amongst the cracks searching for sleeping skinks to eat. Eventually, all the students took turns holding the docile, exotic-looking creature. There did not seem to be any fear toward snakes amongst our students at that moment, only curiosity and fascination manifested.

The course wrapped up with a sundowner at Lake Panic. Sounds of hippos in the distance and a beautiful sky created a perfect backdrop to reflect on the past two weeks. The

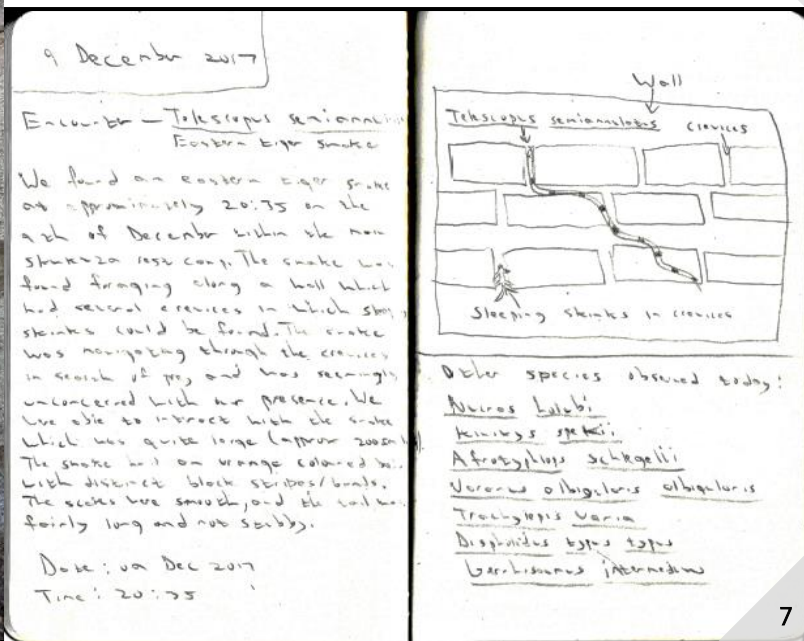
“ I see this course as a great opportunity to further my knowledge in the biological sciences, as well as gain an array of practical research experience. ”



Skukuza Science Centre is large enough to accommodate multiple groups at a time, and newly arrived students from Quest University, Canada, ventured to Lake Panic to enjoy the view also. Here we had two groups of students from incredibly different walks of life sharing the same Kruger experience. Both groups were conversing separately out of shyness, and with not much more than a brief introduction, the conversation between the two groups lit up. It was an educator's dream to see people who have incredibly different life histories conversing. Interacting with people outside of one's circle is critical for becoming a well-rounded, worldly citizen.

15 days later, students returned to their communities having had the opportunity to interact with 36 species of reptiles and learn about their biology, build research skills, walk amongst megafauna, and engage with a diverse group of people. RDAS 2017 was an experience-rich educational adventure which was an overwhelming success. We look forward to repeating this course again with a new group of students in 2019!

A page from an RDAS student's field journal.



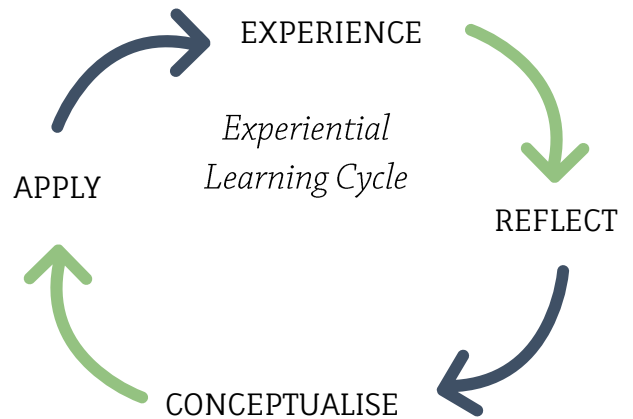
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Experiential Learning

Experience-based learning invokes hands-on activities and tasks to promote a greater understanding of a topic. Unlike a traditional academic classroom, immersion within subject matter allows for real-world experiences making course material highly relevant to learners. As a result, experiential learning significantly improves engagement, information retention, and knowledge generation while supporting the development of practical skills.

As nascent ecologists, zoologists, and conservationists, students need the opportunity to visualize, hear, smell, and indigenous flora and fauna. Spending time in the field delivers experiences that cannot be recreated in a traditional lecture hall making field trips an important supplement to traditional academic schedules. Experiencing the natural world first-hand invites students to observe, question, and reassess their understanding regularly leading to enhanced capabilities as self-learners and critical thinkers.

For two weeks, RDAS students learned through experience and from their instructors in the heart of the Kruger National Park. RDAS provided students with a classroom enriched with biology. Conducting a reptile diversity survey formed the central basis of the course



“Learning is the process whereby knowledge is created through the transformation of experience” –DA Kolb 1984



“

There is something unique and special about seeing and physically holding the animals you already see on TV or in pictures. There is a newly profound bond and respect that has arose in me and it is all thanks to this reptile diversity course.





I have always appreciated general biology but now I appreciate it even more because of the things I learnt and the experiences I had in the KNP.”



which required students to work together to construct trap arrays and to check them for animals each morning and evening. First-time captures offered the exciting chance to hold, inspect, and learn about the biology of a new animal. As a supplement to trapping, several sessions were spent actively searching for reptiles in the landscape—under rocks being a favourite spot for many snakes and lizards. Additionally, students worked in groups to develop their own research projects and were required to present the results much like a consultant would be required to do. Such tasks enable learning by doing and contribute to practical skill development.

To assist students through the experiential learning cycle¹, students were given the task of field journal writing. Field journal writing is a formalized way to ensure experiences and observations receive reflective thought. What did I experience; what was the outcome; who or what was involved, etc.? The next component of the journaling task required students to conceptualise the experience. What did I learn from this experience that I had not already known? The last aspect of the assignment required students to create hypotheses and apply what they learned to another system. Based on what I learned, I wonder if...? Journaling takes observation from a passive process to active and ultimately forces learners to create knowledge from their experience.

During the heat of the day, RDAS students attended lectures and hands-on tutorials which provided the necessary background information. Without the proper context, learners struggle to place new information into their knowledge network and experiences fail to offer the fullest learning potential. Such lectures walked students through identifying reptiles, conducting a reptile survey, the basics of savanna ecology, and how to be a biological observer. Several lectures encouraged deeper scientific thinking, as well, and focused on more specific topics like maternal care in African pythons, snake ecophysiology, and trophic ecology.

Students left RDAS having had an experience that offered more than any traditional classroom could have provided. RDAS provided a forum for students to engage with biology and research at a deeper level and promoted a philosophy of exploration and pursuit of knowledge. Educational opportunities like those created by RDAS make for the most adept conservationists, reserve managers, and academics.

¹Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development* (Vol. 1). Englewood Cliffs, NJ: Prentice-Hall.

4

Studying the Understudied

South Africa is renowned for its diversity of wildlife, plants, and landscapes. From mountains to deserts and coastal forest to savanna, South Africa showcases an extreme range of biomes which are inhabited by a fascinating but poorly understood taxon—reptiles. Across the entirety of the country—a region in which it takes a little more than 24 hours to drive end-to-end—there are 477 known reptile species comprised of 292 lizards, 143 snakes, 32 testudines, 9 amphisbaenids, and 1 crocodile. Beyond an understanding of reptile taxonomy and systematics, most aspects of reptile biology and ecology in South Africa are poorly known.

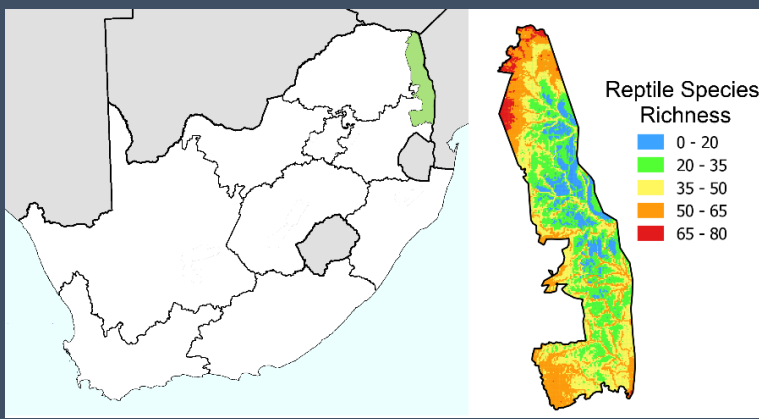
Unlike charismatic megafauna, colourful birds, or floristic hotspots, reptiles receive little attention resulting in an, often, inadequate understanding of the biology of most taxa. Herpetology, especially in a South African context, faces several challenges which contribute to the current gaps in our knowledge. Primarily, there are few people trained formally as reptile biologists and even fewer hold academic positions. Consequently, there are a limited number of investigative studies published which enhance our understanding, and there is a failure to transfer knowledge and skills to students. For university students, reptile-focused courses rarely exist and tends to be addressed as a subtopic of a

“I applied for this course because I want to know and study more about reptiles since I have been interested in them from a young age. It is also the fact that it's a broad field with a few people doing it.”

course—if that. The cumulative effect of low retention rates of students in science and a failure to teach students about reptiles has produced a gap in human resources. When opportunities do become available, people are hesitant to study reptiles, especially snakes, because of fear and ideologies that frame reptiles negatively. However, these concerns wane when students become more educated about reptiles. Altogether, these factors contribute to our meagre understanding of South Africa’s reptiles and efforts directed toward research and education will improve the state of herpetology in South Africa.

Why should we study reptiles at all? At its most basic, we should seek to understand the world around us and neglecting a group of organisms makes for an incomplete base of knowledge. The fascinating and diverse feeding, locomotor, defense, and reproductive strategies that reptiles exhibit offer excellent avenues of research. Only in recent years have we begun to learn about interesting





Box 1. Predicting Reptile Distributions in Kruger

The Kruger National Park sits on the eastern edge of Mpumalanga and Limpopo and covers an area of 19,000 km² making it the largest public nature reserves and among the most well-studied nature reserve in South Africa. Despite this, the available data for the distribution of reptile species within KNP is remarkably incomplete. Information regarding geographic distributions of species rarely exists at a fine enough scale and for species that have low detection rates, like snakes and fossorial reptiles, distribution data are exceedingly rare. Furthermore, information regarding the composition of reptile communities is non-existent for KNP, SANParks, or, more broadly, southern Africa.

SANParks ecosystem managers utilise thresholds of potential concern (TPCs) to identify when intervention is needed to meet management objectives. TPCs are the upper and lower thresholds of acceptable change in an environmental indicator. For reptiles, the definition and application of TPCs remains underdeveloped, thus limiting management efforts. Moreover, to effectively manage for reptile diversity within the KNP and assign appropriate TPCs for reptile communities requires an understanding of species diversity, species richness, population size, community composition, and any temporal and spatial changes in these indicators. However, the reptile distribution and community assemblage data within the park is insufficient.

The goal of this project is to build a database of known reptile localities and to model predictive distributions and community assemblages using presence-only occurrence data and environmental variable. RDAS provided the opportunity to add new locality data to the database and to test the accuracy of the predictive models through field sampling. Ultimately, this study will provide a framework for predicting reptile distributions and community structure within the KNP and will assist in the development of monitoring strategies for reptiles.

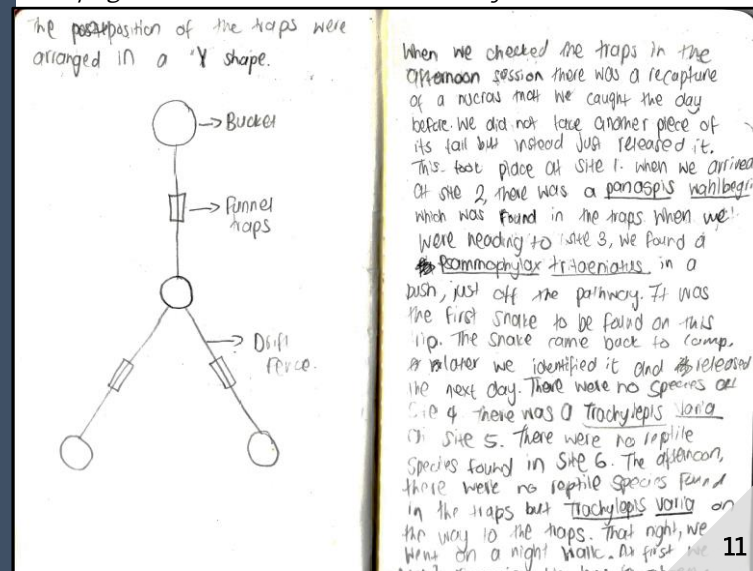
This project is being completed by Jody Barends as part of his masters degree at the University of the Western Cape under the supervision of Bryan Maritz. Mr Barends was one of the students who participated in the RDAS course in 2017.

phenomena like maternal care in African pythons, caudal luring and chemical crypsis in puff adders, and communication and deception in flat lizards. Studying reptiles serves to better understand the evolution and diversity of animals and draw conclusions about the selective advantage of behaviours and processes. Moreover, only through dedicated studies are we able to make data-supported conclusions about the functional importance of a species in a community and how best to conserve threatened species.

Biodiversity surveys provide foundational information about the occurrence of species in a landscape which can be used to better predict their distribution. Even with KNP being among the best studied nature reserve in the country, reptiles are rarely studied in the park and there is no formal management strategy for reptiles (Box 1). In fact, the last formal reptile survey in the KNP was conducted by U. Pienaar in the 1970s. For RDAS, the design and execution of a reptile survey in the greater Skukuza area acted as the central research focus aimed to provide insight into species distributions and community compositions across the park.

Detectability poses a challenge for the study of reptiles. To increase the likelihood of finding elusive animals, six sets of trap arrays were installed in the veld by students. Traps consisted of plastic fencing that direct animals into either one of four submerged buckets or one of six funnel traps (mesh tubes that animals can enter but not exit).

A page from an RDAS student's field journal.



RDAS students worked together to craft and install trapping arrays at six sites around the Stevenson-Hamilton supersite—a research focal point which allows researchers to integrate their findings with other variables which have been measured previously across the supersite. Each morning and evening—rain or shine—students checked traps. By the end of the survey, students had recorded the presence of 14 species of reptiles, represented by 52 individuals, across the six sites but noted significant variation in the composition of the reptile communities across the sites. An additional 22 species were found *ad hoc* throughout the greater Skukuza area. The results highlight that variation community composition exists at a fine-scale which could be due to differences in environmental variables like substrate and vegetation type. In the long-term, RDAS aims to continue sampling reptile communities across the park to



which factors drive species assemblages. For 2019, RDAS aims to include six more sampling sites including sites within and outside of elephant enclosures to identify how fallen vegetation impacts the reptile diversity and community composition.

RDAS emphasized the scientific process throughout the course. The reptile survey taught students how to collect data and required students to think about the methodology of the field work. Group research projects encouraged the development of research questions that could be addressed during the length of the course. For instance, one group hypothesised that skink body condition is positively associated with anthropogenic habitats due to the availability of resources. In addition to collecting data, students had to analyse and present their findings to the class. While planned laboratory experiments are often fool-proof, field research comes with challenges like finding sufficient study animals or rodents eating holes in funnel traps. Although these set backs are never ideal, it is important for students to experience the highs and lows of field work as it trains students to think how they might



“

In the beginning of the course, I was scared of reptiles but all of that changed because I can now hold reptiles. My view about reptiles has totally changed and I've developed so much love for reptiles.”





correct an issue or approach a question differently. Through several forms of instruction, RDAS students practised the scientific method and learned how to study the ecology of reptiles.

From the RDAS experience, students are more empowered biologists. Because students have likely never studied reptiles, RDAS provides useful information that curbs misconceptions and builds a greater understanding of the natural world. Following arachnids, reptiles are the group of animals most likely to be intentionally killed due to fear. Through the experience and education received on RDAS, students who would not touch a reptile could be seen holding them and studying them curiously.

Although RDAS only supports 10 students per course currently, the transfer of knowledge does not stop at the learner. Students are strongly encouraged to pass on their newfound appreciation of reptiles to their friends, families, and communities. Beyond this simple message, RDAS students are set to become tomorrow's scientists and reserve managers and, we hope, the appreciation of reptiles invoked by RDAS will lead to better conservation strategies and more focal studies on reptiles.

The understudied nature of reptiles makes for an opportune educational experience. At its core, RDAS acts to stimulate an appreciation for reptiles and, ideally, a desire to pursue herpetology related studies in the future. In the short-term, a new cohort of students learn through experience about reptiles, which are rarely the focus of an entire course. Through long-term projects, RDAS will result in improved management and conservation strategies involving reptiles in the Kruger National Park and will enhance our overall understanding of reptile biology.

RDAS unites education and research to create an opportunity for students that encourages their betterment and potential for success. Ultimately, the resources and training provided by RDAS will significantly improve that state of reptile research and contribute to an improved understanding of the natural world through the findings made on the course and through the excellence created within the students.

“

My view about reptiles has changed a lot. Before, I used to see reptiles as small animals that needed to be killed when found associated with human habitats. For example, if I'd come across a snake, venomous or not, I would kill it. But now, I know how to identify if a snake is venomous and can prevent it from getting too close to human habitats.”



5

Building Human Capacity

South Africa has been free of apartheid for over two decades, but society still bears the deep scars of a long history of inequality. The country has been left economically stratified by race leaving opportunities and experiences out-of-reach for many South Africans. In alignment with national strategies aimed at reducing socio-economic inequality, RDAS strives to bridge the gap by providing a quality educational experience to promote an influx of skilled post-graduates and career scientists into the system.

Quality education is arguably the most important means of overcoming social injustice and promoting opportunity. However, access to high-quality education is not universal but rather linked to wealth. In part, the few black and coloured citizens in academia and science-related positions can be attributed inequality in education. A 2016 study found that 78% of Grade 4 students cannot read for understanding and that the lowest scores

were produced by students from rural communities and townships who were the most economically disadvantaged students tested. In an educational system that fails to teach learners vital skills, like reading, reaching university must be acknowledged as a major accomplishment. The students who make it through the system are deserving of praise but also continued support along their career paths.

Historically, many universities in South Africa felt the tight grip of apartheid's control. Universities for black and coloured students were not created for knowledge creation but rather to fulfil an apartheid socio-political agenda. As a consequence, many of these institutions failed to develop research and post-graduate programs². Today, higher-

¹ Howie, S.J. *et al.* (2017). PIRLS LITERACY 2016: South African Highlights Report. Pretoria: Centre for Evaluation and Assessment.

² Bunting, I. (2002). *The Higher Education Landscape Under Apartheid. Transformation in Higher Education*. Rondebosch: Centre for Higher Education Transformation.



My appreciation of biology has improved tremendously. Spending time in nature where organisms and their processes are occurring constantly puts a new perspective on understanding and appreciation.”





The chance to experience new places, interact with different people, and observe nature drives many people to travel. Universities around the world now recognize the importance of travel for the education and growth of their students. Leaving behind one's community to travel to unknown lands encourages self-discovery, broadens perspective, and promotes more adept individuals. However, most South Africans face economic limitations which restricts travel opportunities. Funded 100% by donations, RDAS offered the opportunity to travel—a transformative experience that should be had by all.

education in South Africa is transforming, but students from historically disadvantaged universities and universities serving poor communities are still in need of support. To this point, a major initiative of South Africa's National Research and Development Strategy is to alleviate the shortage of people from previously disadvantaged communities entering and remaining in the sciences³. With South Africa's history and the resulting socio-economic inequality in mind, RDAS provided an intensive educational experience in service to students from historically disadvantaged universities and backgrounds.

There is no easy fix for the current socio-economic inequality facing millions of South Africans. Through RDAS, we strive to improve the likelihood that our students succeed, and with each successive cohort, ultimately, contribute to a more just and productive scientific community and country.

Strengthening scientific capacity goes beyond transferring knowledge. Problem solving and critical thinking, which are essential for success in science, must be practised. The research-centric nature of the field course provided ample opportunity to generate hypotheses about study organisms, engage in thoughtful discussions, and craft field studies. Importantly, being based within ecosystem of the study organisms forced the students to think about the interconnectedness of reptiles with other fauna and flora.



South Africa lacks the human resources devoted to identifying, studying, and conserving the nation's reptiles. With the ability to identify reptile taxa, understand their biology, critically assess misconceptions, and, importantly, understand why herpetofauna need to be studied, RDAS students are more prepared for zoology-oriented careers. Importantly, RDAS aimed to encourage a new generation of herpetologists and to develop herpetology community that better represents the demographics of South Africa.



³ Department of Science and Technology. 2002. South Africa's National Research and Development Strategy. Government of the Republic of South Africa.

6

Looking Ahead to RDAS 2019

With the successful completion of RDAS 2017, we are eagerly looking ahead to RDAS 2019. As we plan the newest installation of the course, several changes will be implemented to ensure the course meets the envisioned educational and research outcomes.

For RDAS 2019, we are seeking 2nd year students and highly motivated 1st year students only. Students in honours and masters are often already conducting field research and engaging with science at a deeper level. By targeting younger students, RDAS aims to encourage scientific skills and passion among students who have not yet, and may not experience, field research which will lead to a successful group of post-graduate students in the university system.

We aim to increase our class size by two students this year to invite teaching assistants on the course. Senior students will have the chance to share their experience and expertise which is an empowering and educational opportunity.

On the research side, we will be adding six more sites to the reptile survey project. To make checking 12 sites easier, we will require an extra game guard and game drive vehicle such that we can have two groups of staff and students in the field at the same time. This setup overcomes the need to ask for volunteers to sit out and allows everyone to be part of the experience at all times. Much to look forward to in the coming year!



Course Dates

5 Dec. – 15 Dec. 2019

Capacity

10 students + 2 student TAs

Candidates

2nd year students (highly motivated 1st years will be considered)

Target universities

University of the Western Cape
University of Venda
University of Mpumalanga



Financial Statement

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Detailed Income Statement

	2017	2019 Estimated
REVENUE	R 176,028.25	R 121,823.25
Donation revenue	72,328.25	13,500.00
Donated goods & services		
Accommodation	14,240.00	26,235.00
Administrative	32,000.00	22,000.00
Airfare	6,000.00	0.00
Catering	20,200.00	0.00
Course Supplies	3,260.00	1,500.00
Ground Transport	0.00	0.00
Project-related	28,000.00	36,000.00
Surplus income	0.00	22,588.25
OPERATING EXPENSES	R 153,440.00	R 158,185.00
Accommodation	14,840.00	26,985.00
Administrative Fees	32,924.00	23,500.00
Airfare	9,091.16	10,500.00
Catering	43,623.40	38,300.00
Course supplies	6,254.78	5,120.00
Ground Transport	14,099.38	7,580.00
Project-related	32,607.28	46,200.00
NET INCOME	R 22,588.25	R -36,361.75

STAFF BIOS



Bryan Maritz

Founder of RDAS. Senior Lecturer at the University of the Western Cape. His lab in the Department of Biodiversity and Conservation Biology focuses on the functional role of snakes within African ecosystems, including patterns of predator-prey dynamics, competition, resource utilisation, and community functional traits.



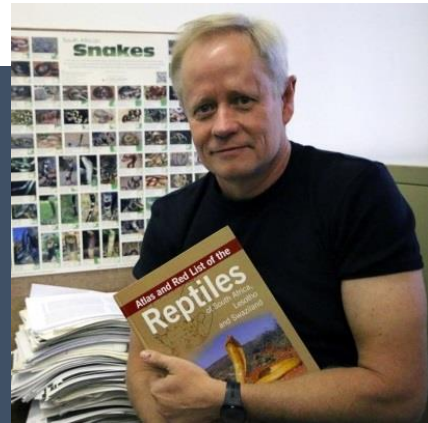
Robin Maritz

Course manager for RDAS. She has taught field courses in several locations, including the Galapagos Islands and Namaqualand, South Africa. Her research interests include infectious diseases of snakes and their prey and the trophic ecology of snakes in southern Africa.



Donovan Tye

Research manager for the Organization for Tropical Studies (OTS) based in the Kruger National Park. He has spent several years teaching for the OTS where he has taught ecology. His research interests are based in the field of savanna ecology with a specific interest in understanding the determinants of species and trait assemblages in disturbance-prone ecosystems.



Graham Alexander

Professor at the University of the Witwatersrand. His research laboratory in the School of Animal, Plant and Environmental Sciences focuses on ecology, physiology, biogeography and conservation of reptiles. He has a particular interest in elucidating causality of range limitation in reptiles and using this information for conservation purposes.

CONTACT

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