YOU WANT TO BE A WHAT?

MAKING SENSE OF A CAREER IN ZOOLOGY

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Introduction

So, you have just finished Grade 12 and the celebrations about getting a university exemption pass are winding down. Now it’s time for you to sit down and decide what you would like to do for the rest of your life! Out of all the ones you applied to, which university should you choose to attend? Which subjects should you take? Will you be able to make new friends? All very HECTIC decisions!

In this short booklet, we hope to provide you with a bunch of information on a subject you may not have even heard of before – ZOOLOGY. We describe how working as a zoologist doesn’t necessarily mean that you will end up being a zookeeper in the Jo’burg zoo. We discuss which school subjects and university degrees can help you become a zoologist and the places you could choose to study. But probably most importantly, we have asked a few professional zoologists to give you some insight into what it means to do what they do.

“Animals, whom we have made our slaves, we do not like to consider our equal.”

Charles Darwin
What is zoology anyway?

In its broadest sense, zoology is the study of animals and a zoologist is a scientist who studies animals and their environment or habitats. Animals, in this context, are any living organisms that are not plants, fungi, viruses or bacteria (the study of these organisms is the realm of the botanists and microbiologists). Animals include creatures like the marine sponges (which don’t look much like animals!), jellyfish, worms, rock lobsters, snails, insects, fishes, frogs, snakes, birds and mammals.

Making a career out of zoology

To many people, zoologists are those individuals you see on wildlife documentaries on TV. Here, the intrepid researcher is seen studying lions in East Africa, insects in the Amazon jungle, whales off Hawaii, or penguins in the Antarctic. This is the glamorous side of zoology and, of course, not everyone is able to enjoy such opportunities. Nevertheless, zoology can offer a variety of exciting, stimulating and rewarding careers. So, if you have an interest in nature and the environment, maybe zoology and becoming a zoologist is for you?

Because zoology is a very broad area of scientific study, careers can be defined in several ways. For example, one person might specialise in fish (an ichthyologist) whereas another may specialise in mammals (a mammalogist). Yet another might concentrate on the development of the early stages of life in both fish and mammals (an embryologist or developmental biologist). Thus, there are many different ways in which specialists can be defined. Here, we have tried to indicate the more general categories of careers for which employment may be available in South Africa. There is no special importance attached to the classification used; it simply reflects zoology in the country at present and how jobs are described by the wide variety of agencies, institutions and companies engaged in zoological research and employing zoologists. Among others, these include public and private schools, National and Provincial nature conservation agencies, the South African Bureau of Standards, the Council for Scientific and Industrial Research (CSIR), the Medical Research Council (MRC), museums, universities, colleges, zoological gardens, fisheries institutes, the Departments of Environmental Affairs & Tourism, Agriculture and Health, local authorities, game farms, firms of ecological consultants, pharmaceutical companies and many other private and state agencies.
The demand for zoologists varies widely. For example, in most parts of South Africa there are more posts than there are biology teachers so that one will almost certainly be able to get a teaching job, although this may not always be in the most convenient locality. Permanent positions are usually more easily available in applied than in "pure" fields. Openings for entomologists and fisheries biologists, for example, are fairly common, whereas there are a very limited number of university teaching posts, which are highly sought after because they give zoologists an opportunity to do the research of their choice. Members of university staff are awarded research grants by outside agencies such as the National Research Foundation (NRF) to support postgraduate student research and to employ research assistants over the short-term.

What school subjects do I need?

The short answer to this question is that it depends on the university you will be attending. However, most universities require a university exemption with a pass in mathematics. Irrespective of entrance requirements, mathematics as well as physical and life science are highly recommended for prospective zoologists. Oddly enough, physical science (i.e. physics and chemistry) is a more useful Grade 12 subject than life science because many universities start teaching biology (the foundation of zoology) from the basics. It should be noted that entrance requirements may be revised from time-to-time and updated requirements should be obtained from the institution of your choice. The various university web sites are usually good sources for this sort of information.

Which degree should I choose?

A Bachelor of Science degree (B.Sc.) is the basic degree normally required if you wish to become a zoologist. It is a 3-year degree. The exact requirements for a B.Sc. degree with zoology as a major subject are specific to each university. Sometimes the different universities have slightly different courses available that allow students to select specific career paths quite early on. Differences between universities aside, there are a number of points that any prospective zoologist would be wise to consider:

1. Although mathematics and statistics are not required for a B.Sc. degree at all universities, anyone interested in zoological research will find a basic training in these disciplines extremely useful.
2. In order to understand the internal functioning of animals, a university course in chemistry is necessary and is a requirement for the B.Sc. degree at many universities.
3. Students with an interest in ecology are well advised to take botany and/or microbiology as subjects as well as zoology.
4. Students with an interest in physiology or molecular biology will find biochemistry useful.
5. Would-be evolutionary biologists will find courses in genetics essential.
6. A working knowledge of computers and computer programming is also an asset in many fields of zoology.

Specific curricula for degrees will vary from one institution to the next and the latest information should be sought on the home pages of the various institutions. Nevertheless, most will cover very similar subject matter at the undergraduate level. After your B.Sc. degree, you may want to consider pursuing postgraduate study in the form of an honours degree which is an additional one year of study where you obtain further training as a zoologist. Then, if the zoology bug has really bitten, you might consider reading for a Master’s (M.Sc.) or even a Ph.D. (Doctor of Philosophy) degree in zoology.

Where can I study zoology?

Most of the 23 universities in South Africa offer zoology as a major subject. Many factors will influence the university you choose. It may be the one closest to you or the one that you feel has the best reputation, but each one has its own strengths and may specialize in a particular aspect(s) of zoology that interests you. The easiest way to determine which university you would like to attend is to visit the various zoology department web pages:

- Cape Peninsula University of Technology (CPUT)
- Nelson Mandela Metropolitan University (NMMU)
- North-West University
- Rhodes University
- Stellenbosch University (MATIES)
- Tshwane University of Technology (TUT)
- University of Cape Town
- University of Fort Hare
- University of Johannesburg (UJ)
- University of KwaZulu-Natal (UKZN)
- University of Limpopo
- University of Pretoria (TUKS)
- University of South Africa (UNISA)
- University of the Free State (KOVSIES)
- University of the Western Cape (UWC)
- University of the Witwatersrand (WITS)
- University of Venda
- University of Zululand
- Walter Sisulu University
What do real-life zoologists have to say?

**Dr Kwezi Mzilikazi**, Senior Lecturer, Nelson Mandela Metropolitan University

My research interests are in environmental and evolutionary physiology. I am fascinated by how physiological characteristics constrain or aid the flow of resources from the environment to animals and their offspring. My research focus is on metabolic rates, energy balance, body temperature regulation, hibernation and daily torpor. I supervise a vibrant group of Honours, Masters and PhD students and our study subjects include woodland dormice, hedgehogs, elephant shrews, golden moles and bushbabies. Our field sites are in the Karoo, Afromontane forests in the Eastern Cape, KwaZulu-Natal midlands and Limpopo province.

I love travelling and spending time outdoors. I look up to strong characters from all spheres of life – I particularly admire individuals who have overcome great odds to achieve success.

**Brendan Whittington-Jones**, Coordinator, KwaZulu-Natal Wild Dog Advisory Group

In 1997, I completed a BSc degree in Zoology and Entomology at Rhodes University. Thinking it would be my last year of study, and of course that I would know everything I needed to by the end of it, in 1998 I worked through a BSc Honours year in Wildlife Management at the University of Pretoria. I quickly found out that these were only the foundations, critical as they were, to developing an understanding of reserve management through three years at Thula Thula Private Game Reserve, and later, emergency zoological facility management in both Baghdad and Kabul. In 2007, an opportunity arose at the Endangered Wildlife Trust (EWT) to answer research questions around what factors influenced where African Wild Dogs moved when they dispersed out of protected areas in KwaZulu-Natal (KZN), and what the attitudes of rural communities surrounding these protect areas were towards African Wild Dogs. The project resulted in an MSc thesis in 2011 and has evolved to play a stronger management and coordination role in Wild Dog conservation in the province; and now nationally. I currently coordinate the KZN Wild Dog Advisory Group and manage the EWT’s National Wild Dog Metapopulation Project which focuses on range expansion for the species, working towards collective management of isolated populations of the species within South Africa and mitigation of potential Wild Dog conflict with landowners.
Dr Tali Hoffman, Manager MammalMap Africa

For my PhD in Zoology I followed troops of baboons around the mountains of Cape Town to work out where they live, what they eat and how much land they need to survive. Now I’m running a continent-wide project called MammalMAP which aims to find out where all of Africa’s mammals – the big ones, the small ones, the ones that fly and the ones that swim - remain today. We need this information because if we don’t know where the animals are (and in many cases, we don’t), we simply can’t conserve them effectively.

Professor Nigel Bennett, Austin Roberts Chair of Mammalogy and South African Research Chair in mammal behavioural ecology and ecophysiology

The research of Professor Bennett is interdisciplinary in that it covers the areas of ecology, animal physiology and animal behaviour, and he has carried out a large number of studies interlinking these areas using African mole-rats as his model animals. Prof Bennett and his co-workers have investigated ecological and physiological factors that affect the control of reproduction and the evolution of sociality. Unlike other researchers investigating cooperative breeding in mammals, he has done so from a variety of perspectives. The strength of this multi-faceted approach is that it has led to an integrated understanding of reproductive suppression in mole-rats, of a type that has not been achieved for any other taxa.

Professor Bennett’s mole-rat research has set the benchmark for our understanding of phylogenetic and ecological constraints regulating reproductive success and social evolution in mammalian species. He and his collaborators have used the latest molecular approaches together with innovative laboratory and field methods to unravel the mechanisms by which evolution can shape change in socially occurring vertebrate species. The Bathyergidae have developed into a major model for the evolution of sociality and as a consequence contributes immensely to the interdisciplinary efforts to study the causes and consequences of sociality.

Mole-rats, which show a range of complexity of social organization provide an exciting model for reproductive regulation. Professor Bennett is arguably one of the leading researchers in the integrative study of the regulation of reproduction in social rodents and among the leaders in shaping integrative study of brain and behaviour. The work is elegant and unusual in the range of disciplines that are integral to this research.
Zoliswa Nhleko, MSc student, Rhodes University, South Africa

I am studying the black rhino population in 3 parts of the Hluhluwe-iMfolozi Park, KwaZulu-Natal, South Africa. I’m looking at the habitat use of females when they have calves and when they do not. These data will be compared to historical data and will help in determining the causes for the slow reproductive rate of the black rhinos in the park.

Gareth Abramson, Biology Teacher at Bishop David Brown School, Woking, UK

After studying Zoology, I decided to become a Biology teacher. I love the practical nature of the job as biology is about the world in us and around us. I spend lessons involved in discussions with students about anything to do with the human body, ecology and how biology is important in the modern world. I’m never far away from a practical of some sort, whether it’s dissecting a heart, investigating the effect of caffeine on reflexes or exploring the local wild common. Every day brings new challenges and inspiring the students to learn more about themselves and the world they live in is a regular reward.

Wendy Collinson, MSc student, Rhodes University, South Africa

I hail from the UK and originally taught physical education to high school students. I arrived in South Africa seven years ago, where I worked for five years, voluntarily, as a research assistant with the Endangered Wildlife Trust. During this period, I noticed numerous wildlife roadkill on the roads in the area and started to collect data. Based in the far north of the Limpopo Province, near the Botswanan and Zimbabwean borders, the area is rich in wildlife and is home to the World Heritage Site, Mapungubwe National Park. Since then, I have devised a standardized method to detect roadkill and am currently implementing this in the Greater Mapungubwe Area. I am sampling across three ecological seasons (hot/dry, Hot/wet, cold/dry), and have already discovered some alarming statistics. Currently, there is much data on human road casualties, but very little on animal road deaths and particularly not in southern Africa. Despite road traffic being a known cause of wildlife deaths, studies are poorly represented. I am hoping that this study will provide a national strategy to mitigate the impacts of roads on wildlife populations.
John Power, Biodiversity Specialist: Department of Economic Development, Environment, Conservation & Tourism, North West Provincial Government, South Africa

I am employed as a biodiversity specialist with the state, and my focus is the mammals, both large and small. My work is principally field based, say 80% of the time is spent in the field. On a daily basis I capture the small mammals, i.e. rodents, shrews, moles, and bats, with the appropriate equipment so as to cover this group of mammals, which cannot simply be identified when seen running about! For the large mammals I use visual identification, by sightings or signs (spoor, road kills etc.) and set camera traps to record the more elusive species. I systematically cover the whole province by covering all vegetation types, in all land-use types (i.e. rural pastoral, commercial etc.). Since we are mandated to cover all our parks (e.g. Pilanesberg, Madikwe etc.) we update their mammal checklists too, and then I end up spending a month in each park where I simply drive and walk about setting traps and looking for mammals - in a nutshell. I use ArcGIS maps to reconnoitre areas before venturing into them, and then obviously map all records and capture this into a data base - as one does. The information obtained is used to verify findings that consultants find in their surveys when there are pending developments. The information is used simply for species conservation plans, where the emphasis is the Red Data species. Since I have had a background in large carnivore work, I also assist the division charged with problem animal control, with various operations (i.e. collaring, translocations etc.). While out in the field I also part assist with bird records for my ornithologist colleague (who is the bird equivalent to what I do), and then since we are interested in biodiversity I also photographically record any reptiles, and amphibians I encounter, so they can be part of the greater biodiversity data base. Should we employ a herpetologist, they can at least start with something - watch this space as we will needing one at some stage.

I have a masters degree in Zoology, and when I started out, I worked as a technician, and was employed as a guide for a number of years, and found it difficult to get into the conservation industry. The last decade has seemed easier to do so, with many NGO's and state departments more eager to bolster their scientific divisions. The biggest employer though for zoology graduates, is the EIA consultancy industry in the private sector - and for most people it has the most realistic chances of gainful employment. Having worked private, and for an NGO, I prefer working for the state, as there is more job stability, and you are working for an authority so you get to be at the helm of conservation initiatives and species conservation. Jobs may be fewer, but it is well worth applying for positions that come up, and hopefully the other eight provinces will take on board what our province is doing and implement the same model in their provinces where they will likewise employ aspirant biologists needed for biodiversity conservation plans. Advice for unemployed graduates is to assist in citizen science programmes (i.e. Sabap bird atlasing), and volunteer at your universities to gain work experience, and keep updating your CV. Mapping skills (i.e. ArcGIS) is a well worth having. It is a great, and rewarding career!
Anka Bedetti, Research Coordinator, Bundox Wildlife Services, Limpopo Province, South Africa

I was born in Bruxelles in 1987 and left for East Africa with my parents two weeks after, for the first five years of my life. Moving from country to country because of my father’s job as a construction manager also meant that I lived in Mauritius and Dubai too. When I was 18, I decided to go back to Belgium and study biology because I have a passion for nature and wildlife and this grew strongly over the years. In June 2010 I completed a Master’s degree in Evolution and Behavioral Biology with honors (Cum Laude), my major being in Population Dynamics, at the University Of Antwerp in Belgium. For my thesis “Home range and dispersal of small mammals in coastal forests, Saadani National park, Tanzania” I completed 3 months of field work in the coastal forests of Saadani National Park. As I needed more hands-on experience to give me the best chances for a career in research, I decided to join a research expedition organized by Global Vision International for 6 months in South Africa starting in October 2010. I then stayed on for another 6 month as an intern-research assistant tracking lions and became a qualified field guide too. During this period I met Andre de Kock with whom I live on the Venetia Limpopo Nature Reserve - he is the assistant manager. In January 2012, I was selected to start a PhD on “Social and Environmental Determinants of Intermediate and Small-scale Movements of the African Elephants”, supervised by Bruce Page from the University of KwaZulu-Natal, expert in his field for more than 30 years in the area. Since March 2012, I has been working as the Research Coordinator at Bundox Wildlife Services based in Somerville (Mapungubwe Private Nature Reserve, previously known as Vhembe), supporting the research project in return.