



AGREEMENT WITH UNIVERSITY OF MALAYA (UOM) FOR THE TERMINAL AND HONORS YEARS AND BACHELOR HONORS

CONTEXT

The purpose of this agreement is to provide a framework for the collaboration between the University of Malaya and the Ministry of Education, Malaysia, in the area of research and development in the field of health and social sciences.

This agreement is intended to be a framework for the collaboration between the University of Malaya and the Ministry of Education, Malaysia, in the area of research and development in the field of health and social sciences.

Scope of the Agreement

1. The purpose of this agreement is to provide a framework for the collaboration between the University of Malaya and the Ministry of Education, Malaysia, in the area of research and development in the field of health and social sciences.	2. This agreement is intended to be a framework for the collaboration between the University of Malaya and the Ministry of Education, Malaysia, in the area of research and development in the field of health and social sciences.
3. The purpose of this agreement is to provide a framework for the collaboration between the University of Malaya and the Ministry of Education, Malaysia, in the area of research and development in the field of health and social sciences.	4. This agreement is intended to be a framework for the collaboration between the University of Malaya and the Ministry of Education, Malaysia, in the area of research and development in the field of health and social sciences.
5. The purpose of this agreement is to provide a framework for the collaboration between the University of Malaya and the Ministry of Education, Malaysia, in the area of research and development in the field of health and social sciences.	6. This agreement is intended to be a framework for the collaboration between the University of Malaya and the Ministry of Education, Malaysia, in the area of research and development in the field of health and social sciences.
7. The purpose of this agreement is to provide a framework for the collaboration between the University of Malaya and the Ministry of Education, Malaysia, in the area of research and development in the field of health and social sciences.	8. This agreement is intended to be a framework for the collaboration between the University of Malaya and the Ministry of Education, Malaysia, in the area of research and development in the field of health and social sciences.
9. The purpose of this agreement is to provide a framework for the collaboration between the University of Malaya and the Ministry of Education, Malaysia, in the area of research and development in the field of health and social sciences.	10. This agreement is intended to be a framework for the collaboration between the University of Malaya and the Ministry of Education, Malaysia, in the area of research and development in the field of health and social sciences.

TERMINAL AND HONORS AGREEMENT

Minimum Standards and Requirements

The minimum standards and requirements for the terminal and honors programs are as follows:

The minimum standards and requirements for the terminal and honors programs are as follows:

The minimum standards and requirements for the terminal and honors programs are as follows:

Research Program

The research program is a mandatory requirement for the terminal and honors programs.

The research program is a mandatory requirement for the terminal and honors programs.

Assessment

The assessment is a mandatory requirement for the terminal and honors programs.

The assessment is a mandatory requirement for the terminal and honors programs.

Exam

The exam is a mandatory requirement for the terminal and honors programs.

The exam is a mandatory requirement for the terminal and honors programs.

The exam is a mandatory requirement for the terminal and honors programs.

Research and Reporting

The research and reporting is a mandatory requirement for the terminal and honors programs.

The research and reporting is a mandatory requirement for the terminal and honors programs.

Research and Reporting

The research and reporting is a mandatory requirement for the terminal and honors programs.

The research and reporting is a mandatory requirement for the terminal and honors programs.

The research and reporting is a mandatory requirement for the terminal and honors programs.

The research and reporting is a mandatory requirement for the terminal and honors programs.

THE PROJECT: The **AfriCat** Cheetah Project (2018)

Researchers: Dr Anton Gili Tsoflias (project leader)
Prof Gerhard Steenkamp
Prof Emily Mitchell
Dr Roxanne Bask

The AfriCat Cheetah Project was initiated in 2012 as a longitudinal study into the health of cheetahs. Since then, a team of veterinarians and researchers has gathered in total, over 1000 samples each year at the AfriCat Foundation, near Phalaborwa in

northern KwaZulu-Natal to evaluate the health of a group of between 10 and 30 captive cheetahs. The cheetahs are typically anaesthetised and a comprehensive set of samples and data is collected from each individual. Although there have been some research setbacks in this project, the team aim this year to complete the progression of cheetahs through from oral lymphadenitis, gastritis and renal disease which are known to affect the longevity of cheetahs in captivity. Through this study we intend to get a better understanding of the factors that influence the development of these diseases in cheetahs.

The project has been very successful, generating a total of 30 peer-reviewed journal publications (see list below) and has led to the awarding of 2 PhD degrees (Dr Sarah Hudson 4 April 2018, Dr Emma Jean Cassin 20th Dr Roxanne Bask 2017), 1 Master's degree (Dr Christie Boucher 2017) and 1 PhD (Dr Aisha Saadalla 2017) degree. The study on cheetah anaesthetics has also generated sufficient data for Dr Saadalla's PhD study, which she will hopefully complete within the next year.

The project is to be closed down, will be completed in 2018, with one last field trip to AfriCat in the last week of June. This year there are once again several research components to the study.

These include:

- **THE GASTRITIS STUDY** - A total set of stomach biopsies will be collected from each animal by means of a gastric endoscopy. These biopsies will be evaluated by Prof Lorenz to determine the level of gastric inflammation present in each animal. A set of clinical and virus samples will also be collected by Dr Tsoflias for exactly various health parameters to each animal. Dr Tsoflias will also take several additional organ measurements using an ultrasound machine.
- **THE ANAESTHETIC STUDY** - Dr Bask and Dr Tsoflias will be evaluating the safety and efficacy of an injectable anaesthetic combination for the immobilisation of cheetahs in the field. The drug combination (propofol and ketamine) will be given intravenously as a subcutaneous injection. During this time standard anaesthetic data (heart rate, respiratory rate, blood pressure, oxygen saturation, body temperature, etc.) will be collected and where blood samples will be analysed at set intervals for blood gas, pH and electrolyte concentrations.
- **THE NUTRITIONAL STUDY** - This pilot study will evaluate the chronic and metabolic effects of glucose supplementation in the cheetahs diet. Glycemia is an stress test that gives a certain idea to researchers if it is an important component of collagen, is needed for production of antibodies and immune and also functions as an effective neurotransmitter in the brain. Dr Tsoflias's previous research suggests that cheetahs in captivity may not be getting sufficient protein in their diet to meet their metabolic demands. In this study, glucose powder will be added to the cheetahs diet for 1 month prior to sample collection at the end of June.

Concluding remarks

The captive cheetahs at AfriCat are only over 10 years of age. This is the first research we have conducted to determine the chronic condition in such the age. Many of these cheetahs already have some degree of kidney disease. Together with researchers from Belgium and Canada, we are focused starting to evaluate a non-commercial diet in cheetahs. We do hope will significantly benefit animals with kidney disease over the next few years.

Although this research focuses on cheetahs, many techniques collected from kidney disease and the anaesthetic combination that we are evaluating in this study are also applicable to other big cats such as lions, tigers and leopards. We expect that the knowledge gained from this study will have much broader applications.

Published articles

1. Harrison M, van der Merwe A, Tsoflias AG, Day B, Schreiner J. 2015. Long-term survival of a large cheetah population: genetic diversity using single versus microsatellite markers (SSDs) and whether tag is a useful cheetahs genetic diversity. *Journal of Heredity*.
2. Schreiner M, van der Merwe A, Tsoflias A, Archer L, Schreiner M, Harrison M. 2015. Microsatellite and haplotype diversity of the reproductive tract in cheetahs (*Acinonyx jubatus*). *Theriogenology*.
3. Day B, van der Merwe A, Tsoflias AG. 2015. Comparison of high-density microsatellites and short tandem repeat markers in cheetahs (*Acinonyx jubatus*). *Journal of Heredity*.
4. Harrison M, van der Merwe A, Schreiner M, Schreiner J. 2015. Effect of social system and surgery type on surgery times during laparoscopic ovariectomy and oostectomy in captive AfriCat cheetahs. *PLoS ONE*.
5. Lorenz G, Schreiner J, Huchler B, van der Merwe A, Tsoflias AG. 2016. Histologic findings for selected organ systems in cheetahs (*Acinonyx jubatus*). *Journal of the South African Veterinary Association*.