



ISWE Newsletter

Volume 5: Summer 2019

International Society of Wildlife Endocrinology (ISWE) newsletter: Volume 5

In this edition, we highlight the keynote speakers for ISWE 7, spotlight the Endocrine Research Lab at the University of Pretoria, and share some recent publications from our members.

Want to contribute? We are always seeking newsletter content including: photos, publications, and announcements.

Please contact:
iswe.socialmedia@gmail.com
if you have contributions.

Thanks from the newsletter committee!

*Katie Graham, Grace Fuller,
Katie Fowler, Elizabeth
Freeman, Tina Dow & Beaux
Berkeley*

Connect with us on social media!

Instagram & Twitter:
[@iswe_endo](https://www.instagram.com/iswe_endo)

Facebook:
[International Society of
Wildlife Endocrinology-ISWE](https://www.facebook.com/InternationalSocietyofWildlifeEndocrinology-ISWE)

Getting to Know the Featured Speakers for ISWE 7

This fall, ISWE 7 South Africa will include plenary sessions from two endocrine researchers whose bodies of work have contributed greatly to the scientific understanding of how physiological mechanisms shape life histories, sociality, and the evolutionary ecology of wild animals. We asked both speakers to reflect on their careers in wildlife endocrinology.

Ann MacLarnon



Dr. Ann MacLarnon is a Professor of Evolutionary Anthropology in the Department of Anthropology at Durham University, United Kingdom. Dr. MacLarnon has worked on a broad range of areas in evolutionary anthropology, including comparative studies of life histories, spinal cord, brain size and gut size, and the evolution of human speech and breathing control. In recent years, her primary focus has been on ecological physiology. Dr. MacLarnon has directed a non-invasive hormone lab for fifteen years, which she recently moved to Durham. She has collaborated with many behavioral ecologists working on primates and other mammals to investigate questions of reproduction, stress, and energetic ecology combining physiological and behavioral measures.

When asked what drew her to the field of wildlife endocrinology, she replied, *"I was initially interested in collaborating with endocrinology researchers to investigate the physiological underpinning of variation in mammalian reproductive life histories. However, after spending a sabbatical term at the German Primate Centre in Goettingen, Germany, and thanks to the enormously generous support of Michael Heistermann, Keith Hodges and Andre Ganswindt, I was able to start an endocrinology lab at my own university. Many projects and students later, I have recently set up a lab at my new university in Durham, UK. Most of my recent work has been on stress and energetics and questions related to social and ecological responses, involving glucocorticoid and thyroid hormone measurements."*

For Dr. MacLarnon, one of her most surprising findings was an interesting impact of diet on reproductive hormone levels. She noted, *"very high progesterone levels in all females at a particular time of year, in non-seasonally breeding baboons in Nigeria. We believe this is the result of their eating African black plums, which contain high levels of progesterone-like compounds and have long been used medicinally to treat human female menstrual problems."* This fascinating study marked the first time that physiological evidence showed a link between plant consumption and the reproductive biology of wild primates.

ISWE 7 Featured Speakers (continued...)

Nigel C. Bennett



Dr. Nigel C. Bennett is a professor of zoology at the University of Pretoria (UP) and also occupies the Department of Science and Technology/National Research Foundation (NRF) Research Chair in the field of Mammalian Behavioural Ecology and Physiology and the UP Austin Roberts Chair of African Mammalogy. Bennett's research focuses on ecology, animal physiology and behavior using the African mole-rat as his model animal. When asked what drew him to his field of study, Dr. Bennett replied, *"I had always had an interest in reproductive biology, and when I started to look at social African mole-rats in which the reproductive pair are sexually and reproductively active, but the non-breeders show little or no interest in procreation, I wanted to investigate the endocrine pathways by which socially induced infertility may be orchestrated in the social*

mole-rat colonies." His multi-faceted research approach has led to an integrated understanding of reproductive suppression in mole-rats exceeding that for any other taxa studied to date.

An unexpected result in Dr. Bennett's research was about prolactin levels in mole-rats: *"The naked mole-rat is a social African rodent that occurs in colonies of up to 300 individuals. I had noticed in non-reproductive females and males that they had swollen nipples. I suspected that prolactin might be responsible for this and so we measured the circulating levels. To our amazement, many of the animals had very high prolactin levels and were hyperprolactinaemic. This now makes sense since the ovaries of non-reproductive females are prepubescent and the non-reproductive males are azoospermic."*

For Dr. Bennett, one of the biggest challenges he has worked on in his lab was *"getting a luteinizing hormone assay to validate for the African mole-rats. I have had to use a mouse Leydig cell bioassay to measure LH indirectly, but it would be great to have an assay completely validated for mole-rats."*

Dr. Bennett advises students who want to study wildlife endocrinology to work hard and not be put off by troubleshooting assays for measuring hormones. He reminds us, *"Wildlife endocrinology can be very rewarding."*

Photos from the Field:

Dr. Beaux Berkeley of Otterbein University (Ohio, USA) works with a team at Adventures with Elephants in Bela Bela, Limpopo, South Africa to collect voluntary blood samples from African elephants. Dr. Berkeley and her team are studying how blood glucose levels respond to seasonal diet variation in semi-free ranging elephants.



Adventures with Elephants is hosting the International Elephant Foundation's 16th International Elephant Conservation & Research Symposium on October 21-25, 2019, right after ISWE 7.

**INTERNATIONAL
ELEPHANT
FOUNDATION.ORG**

Guess Whose Poo?

Can you "guess whose poo?" Check out the picture below, and see if you can correctly identify the poo. [Answer on page 4.]



Lab in the Spotlight: **Endocrine Research Laboratory** at the Onderstepoort Campus of the Faculty of Veterinary Science, University of Pretoria, South Africa

Dr. Nicole Hagenah is the lab manager of the Endocrine Research Laboratory (ERL) at the University of Pretoria. Currently the lab is located at the Onderstepoort Campus of the Faculty of Veterinary Science, but the lab is moving later this year to the main campus of the University of Pretoria in Hatfield. Here she shares the work she and her colleagues conduct in South Africa.



Team photo of the Endocrine Research Lab

Tell us a little about your lab. Dr. Hagenah: The focus of the lab is to establish and apply non-invasive methods to monitor reproductive status and responses to stressors in captive and free-ranging animals. The ERL is involved in projects that address proximate and ultimate questions concerning regulative endocrine mechanisms which in combination with other factors, like social or ecological changes, influence and control animal behavior.

Our team currently consists of five people: Head of the lab, Prof André Ganswindt; Lab Manager, Dr. Nicole Hagenah; Technicians, Mrs. Stefanie Ganswindt and Ms. Abongile Ndzungu; and Intern, Ms. Chantél Henning.

What are some of your current projects?

- Population dynamics and stress-related endocrine correlates of Cape clawless otters.
- An assessment of body condition, stress and diet in free-ranging African wild dogs from South Africa.
- Comparison of endocrine correlates of tigers freely roaming in South Africa and India.
- Developing a novel, non-invasive technique for monitoring reproductive patterns in ground pangolin scales.
- Non-invasive stress hormone assessment in rock hyrax roaming in a human-dominated landscape.

- Capture as an acute stressor: phylogenetic and seasonal variation in avian stress responses.
- Effects of land use and seasonal variation on diversity, behavior and physiology of small mammal species of the Magaliesberg biosphere.
- The influence of environmental and social factors on physiological stress levels of wild vervet monkeys.

What makes your lab unique and are you interested in collaborating with others in the ISWE community?

We are the only endocrine research lab applying non-invasive methods in Southern Africa, if not the continent. We are definitely interested in collaborating. We would like to learn more about peptide or amine hormone measurements. In turn, we can offer skills regarding the measurement of reproductive function and stressors in wild and captive indigenous species.



Net capture of a thick billed weaver to assess avian stress responses

Recent publications from the lab:

Medger K, Bennett NC, Lutermann H, Ganswindt A (2018) Non-invasive assessment of glucocorticoid and androgen metabolite levels in cooperatively breeding Damaraland mole-rats (*Fukomys damarensis*). *Gen Comp Endocrinol*, doi:10.1016/j.ygcen.2018.05.018.

Webber JT, Henley MD, Pretorius Y, Somers MJ, Ganswindt A (2018) Changes in African elephant (*Loxodonta africana*) faecal steroid concentrations post-defecation. *African Biodiversity & Conservation*, doi: 10.4102/abc.v48i2.2312



ERL team hard at work in the lab!

Jepsen E, Ganswindt A, Ngcamphalala C, Bourne A, Ridley A, McKechnie A (2019) Non-invasive monitoring of physiological stress in an Afrotropical arid-zone passerine bird, the southern pied babbler. *Gen Comp Endocrinol*, doi: 10.1016/j.ygcen.2019.03.002

Any exciting field stories?

- While darting tigers to collect DNA samples and implement contraceptive measures, one animal was given the antidote to wake up. The team had a few more measurements to take when the tiger suddenly woke up and made them all sprint to the vehicles with a boost of adrenaline.
- While she was collecting elephant fecal samples in the Western Cape, a student needed one last sample from a particular individual. Finally, the elephant appeared and dropped feces. Unfortunately, the student was so tired that, when she was in proximity of the dung, she tripped over her own feet and fell forward (hands not yet covered by latex gloves) into the dung. Luckily, her hands saved her face from ending up in the dung pile, but unfortunately, the sample that she was waiting for all day got contaminated. The following day, she had to wait again for a sample from the animal, but in the end, she managed to collect it.

Favorite species or hormone? Favorite species: bullfrogs (*Ptychocheilus edulis*), favorite hormone: corticosterone.

Our "Lab in the Spotlight" feature highlights teams in the ISWE community. Want your lab to be in the spotlight? Email us at: iswe.socialmedia@gmail.com

Recent Publication Highlights:

The “Publication Highlights” section offers a brief summary of recent publications by ISWE members. If you’d like to see your article highlighted in an upcoming newsletter, send us the citation and a photo showing your work in action. All submissions are welcome (email: ISWE.socialmedia@gmail.com)!

Review: Non-invasive measurement of glucocorticoids: Advances and problems



Reliably and adequately assessing stress in animals is a huge topic that we all stress out about! Fortunately, Dr. Rupert Palme addresses many of these concerns in a comprehensive new review paper. The paper examines 1,327 publications that used fecal cortisol/corticosterone metabolites (FCMs) to assess chronic and acute stress in 362 different animal species. (Palme even includes a section justifying why FCMs is his preferred name for these hormone compounds.)

The paper is organized into six sections comprising an introduction, methods for the literature review, how FCMs are currently measured, applications of these measurements, and challenges remaining in this area of research. The online supplement containing links

to all the references and nine tables organized by taxa/topic is an extremely valuable resource.

Palme sets clear standards for what he considers to be biologically meaningful validations and rates the papers accordingly. Consistent, simple sample collection and storage, and reasons for selecting a particular assay are clearly emphasized. There is also a particularly useful discussion on how to determine if an assay is validated properly. These recommendations are critical, as applications of FCM analysis are widespread across stress biology, animal welfare, and conservation. Palme concludes with a call for renewed review of current methodologies to ensure that future applications are sound. This paper should be a mandatory read for anyone new to wildlife endocrinology, and is a beneficial resource to all lab and field practitioners.

[Palme, R. \(2019\) Non-invasive measurement of glucocorticoids: Advances and problems. *Physiology and Behavior*, 199: 229–243.](#)

Cassowary casques act as thermal windows

Animals living in environments with extreme conditions must be efficient at body temperature regulation—offloading heat at high temperatures and restricting heat loss at low temperatures. To facilitate this process, some species have evolved unique structures to act as a heat exchanger, also known as a “thermal window.” In order to assist in this process, these structures must be highly vascularized and uninsulated. The cassowary is a large-bodied, flightless bird that inhabits tropical Oceania. During summer, temperatures can reach levels of $\geq 40^{\circ}\text{C}$. Covered with dark plumage, the cassowary must be able to dissipate heat proficiently. Thus, Eastick et al. hypothesized that the prominent casque of the cassowary acts as a thermal window.



Utilizing infrared thermographic analyses, Eastick et al., examined the ability of the casque to dissipate and restrict heat exchange in a range of ambient temperatures. The casque showed capacity for thermal adjustment at both low (5°C) and high temperatures ($\geq 30^{\circ}\text{C}$). At high temperatures, the casque dissipated the greatest amount of heat per m^2 compared to similar structures, accounting for 8% of all heat exchange. Interestingly, at intermediate temperatures the casque appears to be thermally heterogeneous, with the posterior region heating up before the front. In addition, data collected via thermal profiles showed the four casque regions displayed significantly diverse heat dissipation patterns. Similar casque-like structures have been identified in dinosaurs and pterosaurs. Results from the Eastick et al., study could lend insight into these as yet understood cranial enhancements. It may be that comparable features also served a thermoregulatory role in these extinct species.

[Eastick, DL., Tattersall, GJ., Watson, SJ., Lesku, JA., Robert, KA. \(2019\) Cassowary casques act as thermal windows. *Scientific Reports*, 9:1966.](#)

Guess whose poo?

Answer: **Black-crowned night-heron (*Nycticorax nycticorax*).** This migratory species can be found in city parks and zoos. Since 2014, Lincoln Park Zoo has studied stress hormones of the colony that gathers in Chicago each summer.

Did you know? You can identify bird species based upon the splay characteristics of their dejecta. Ornithologists use the size, color and consistency of the dejecta envelope (the uric acid portion), nucleus (solid, fecal matter core) and lobes (pendulous or detached portions of the splay) for identification. With knowledge of these different parts of bird splay, you too can determine which species desecrated the windshield of your car!

Source: Hansard, Peter & Burton Silver (1991) *What Bird Did That? A driver's guide to some common birds of North America*. Ten Speed Press, Berkeley, CA.
Photo: Ivy Yen (Lincoln Park Zoo)

Ready for a Wild Time?

No need to stampede! We've got you covered with some helpful tips as you prepare for ISWE 7:

Important Dates:

Early registration deadline: July 2, 2019

Late registration deadline: August 5, 2019



To register, or for more details, head to the conference website:

<https://www.iswe-endo.org/conference/>

- On the date of your travel, your passport should have greater than six months until its expiration date—if it is expiring soon, you should renew before travel.
- Check your country's regulations on vaccines and medicines before traveling. US residents traveling to South Africa must have measles and routine vaccines (check with your physician).
- If you have a poster or presentation accepted and cannot attend the conference, please contact the Committee Chair, Diana Koester (dck@clevelandmetroparks.com) ASAP.
- Unable to travel easily to South Africa with your poster? Kruger National Park and Mpumalanga Promotion Events has kindly offered poster printing services for presenters! To take advantage of this service, email an electronic version of your finalized poster **BEFORE September 29th, 2019** to Jackey Deacon (dot@mpu.co.za). Cost for this service is R450.00 (~\$33) and can be paid via credit card when sending your poster to Jackey Deacon. *Exchange rate: ~14 South African Rand = 1 US Dollar.

Save the Date!

7th Meeting
of the
International Society of Wildlife Endocrinology (ISWE)
October 13th - 16th, 2019
Hosted by:
Mammal Research Institute, University of Pretoria
Held at:
Kruger National Park



KRUGER
NATIONAL PARK

