

## Dr. Danielle L. Levesque

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## Professional Appointments

**Assistant Professor of Mammalogy and Mammalian Health**, *University of Maine, USA.* (2015-ongoing)

**Cooperating Assistant Professor**, *Climate Change Institute University of Maine, USA.* (2016-ongoing)

**Research Associate**, *Universiti Malaysia Sarawak, Malaysia.* (2016-ongoing)

**Invited Member**, *IUCN Small Mammal Specialist Group* (2017-ongoing)

**Associate Editor**, *Functional Ecology* (2017-ongoing)

## Education and Professional Experience

- **Postdoctoral Fellow**, *Universiti Malaysia Sarawak, Malaysia.* (2014-2015)  
Host: Professor Andrew Alek Tuen
- **Ph.D.**, *University of KwaZulu-Natal, South Africa.* Zoology, Area of Specialization: Evolutionary Physiology. (2009-2014). Advisor: Professor Barry G. Lovegrove  
Dissertation: *Fast Life in the Slow Lane- Life History and Energetics of a Basal Placental Mammal Setifer setosus (Schreber, 1778)*
- **Research Field Assistant**, *University of Cambridge, UK.* Kalahari Meerkat Project. (2008-2009) PIs: C. Rafael Mares, Professor Tim Clutton-Brock
- **M.Sc.**, *Brock University, Canada.* Biological Sciences. (2006-2008). Advisor: Professor Glenn J. Tattersall. Dissertation: *Seasonal Changes in Behavioural and Thermoregulatory Responses to Hypoxia in the Eastern Chipmunk (Tamias striatus)*
- **B.Sc.**, *McGill University, Canada.* Agricultural and Environmental Sciences, Major: Wildlife Biology. (2002-2006) Advisors: Associate Professor Murray M. Humphries and Professor Gordon C. Grigg. 3<sup>rd</sup> Year Project: *Thermoregulatory Responses of the Short-Beaked Echidna (Tachyglossus aculeatus) to a Range of Constant Temperatures.*
- **Semester Abroad (B.Sc.)**, *University of Queensland, Australia* (2005)

## Fellowships and Awards

- Universiti Malaysia Sarawak Postdoctoral Research Fellowship. *Tropical Energetics-Thermoregulation in free-ranging Scandentians (Tupaia sp.)* (2014-2015, \$48,000)
- NSERC Canada Postgraduate Scholarship (Doctoral- 3 year). *The influence of deforestation on patterns of heterothermy and life history characteristics in the greater hedgehog tenrec, Setifer setosus* (2010-2013, \$63,000)
- Distinguished Graduate Student Award (Brock University) for top MSc in Biological Sciences (2008)
- Ontario Graduate Scholarships in Science and Technology (2006-2007, \$11,250)

## Grants

- FY19 Sustainability Research Grant from the Mitchell Center for Sustainability Solutions. *Mitigating socioecological determinants of tick-borne disease risk in Acadia National Park*. co-PI (2018, \$40,705)
- UMaine Research Reinvestment Fund Student Award Competition. *Impacts of climate change on the geographic range expansion of ticks and tick-borne disease in Maine*. co-PI (2018, \$31,132)
- NSF RNC #1624171 F.E.W.E.R. small project grant. *Tropical small mammal physiology in a changing world*. (2017, \$4000)
- NIFA Hatch Grant. *Small mammal physiology in relation to temperature, humidity, and climate change*. (2016)
- ADVANCE RisingTide Center Professional Development Grant. *Assessing responses to high temperatures for predicting responses to climate change*. (2015, \$7500)
- Company of Biologists Travel Grant, ICCPB Krakow (2015, \$910)
- Society of Experimental Biologists Travel Grant, SEB Prague (2015, \$505)
- Journal of Experimental Biology Travelling Fellowship. *Thermal biology and the role of the beak in heat loss and water conservation in Darwin's Finches* (2014, \$3,730)
- Canadian Society of Zoologists CPB Section Travel Grant. *Thermal biology and the role of the beak in heat loss and water conservation in Darwin's Finches* (2014, \$500)
- Ministry of Higher Education, Malaysia. *Thermal physiology of tarsiers and treeshrews in Sarawak, Borneo*. Co-PIs: Professor Andrew Alec Tuen, Professor Barry Lovegrove (2013-2015, \$27,000)
- Charlotte Mangum Student Support Program, Society for Integrative and Comparative Biology Conference (2013, ~\$200)
- Journal of Experimental Biology Travelling Fellowship. *Tropical Energetics-Thermoregulation in free-ranging Scandentians (Tupaia sp.)* (2012, \$3,800, declined)
- International Hibernation Symposium Travel Grant (2012, \$1120)
- College Conference Travel Grant, University of KwaZulu-Natal (2012, \$1300)
- Doctoral Research Grant, University of KwaZulu-Natal (2011, \$1400)
- EPCOR Water Ltd. Student Travel Award (2011, \$500)
- Northern Scientific Training Program Research Award. *Respirometry and energetics of breeding and lactating female red squirrels* (2006, \$1000)

## Publications

### **Manuscripts Submitted or in Preparation \*indicates student author**

Thonis, A\*, A.A. Tuen, B.G. Lovegrove, **D.L. Levesque**. High upper limits and a large thermoneutral zone in a small tropical mammal. Under revision *Physiological and Biochemical Zoology* PBZ-18073.

**Levesque, D.L.** and K.E. Marshall. Do endotherms have thermal performance curves? Invited Commentary for the *Journal of Experimental Biology* to be submitted July 2018.

### **Published Peer Reviewed**

- 13) **Levesque, D.L.**, A.A. Tuen, B.G. Lovegrove. 2018. Staying hot to fight the heat- high body temperatures accompany a diurnal endothermic lifestyle in the tropics. *Journal of Comparative Physiology B* DOI : 10.1007/s00360-018-1160-7

- 12) **Levesque, D.L.**, A. Menzies, G. Larocque, M. Landry-Cuerrier, M.M. Humphries. 2017. Embracing heterothermic diversity: non-stationary waveform analysis of temperature variation in endotherms. *Journal of Comparative Physiology B*. 187: 749-757 DOI: 10.1007/s00360-017-1074-9
- 11) **Levesque, D.L.**, J. Nowack and C. Stawski. 2016. Modelling mammalian energetics: the heterothermy problem. *Climate Change Responses* 3:7 DOI: 10.1186/s40665-016-0022-3
- 10) Sinclair, B, K. Marshall, M. Sewell, **D.L. Levesque**, C.Willett, S. Slotsbo, Y. Dong, C. Harley, D. Marshall, B. Helmuth, R. Huey. 2016. Can we predict ectotherm responses to climate change using thermal performance curves and body temperatures? *Ecology Letters* 19:1372-1385. DOI:10.1111/ele.12686
- 9) Lovegrove, B. G., K.D. Lobban, and **D.L. Levesque**. 2014. Mammal survival at the Cretaceous–Palaeogene boundary: metabolic homeostasis in prolonged tropical hibernation in tenrecs. *Proceedings of the Royal Society B* 281: 20141304. DOI: 10.1098/rspb.2014.1304
- 8) **Levesque, D.L.**, K.D. Lobban and B.G. Lovegrove. 2014. Effects of reproductive status and high ambient temperatures on the body temperature of a free-ranging basoendotherm. *Journal of Comparative Physiology B* 184: 1041-1053. DOI: 10.1007/s00360-014-0858-4
- 7) **Levesque, D.L.**, and B.G. Lovegrove. 2014. Increased homeothermy during reproduction in a basal placental mammal. *Journal of Experimental Biology* 217: 1535-1542. DOI: 10.1242/jeb.098848
- 6) Lovegrove B.G., C.I. Canale, **D.L. Levesque**, G. Fluch, M. Řeháková-Petrů and T. Ruf. 2014. Are tropical mammals physiologically vulnerable to Arrhenius effects and climate change? *Physiological and Biochemical Zoology* 87: 30-45. DOI: 10.1086/673313
- 5) **Levesque, D. L.**, O. M. A. Lovasoa\*, S. N. Rakotoharimalala\* and B. G. Lovegrove 2013. High mortality and annual fecundity in a free-ranging basal placental mammal, *Setifer setosus* (Tenrecidae: Afrosoricida). *Journal of Zoology* 291: 205-212. DOI:10.1111/jzo.12063
- 4) **Levesque, D.L.**, D. Rakotondravony, D. and B.G. Lovegrove. 2012. Home range and shelter site selection in the greater hedgehog tenrec in the dry deciduous forest of Western Madagascar. *Journal of Zoology* 287: 161-168. DOI: 10.1111/j.1469-7998.2012.00899.x
- 3) Mares, R., A.J. Young, **D.L. Levesque**, N. Harrison and T.H. Clutton-Brock. 2011. Responses to intruder scents in the cooperatively breeding meerkat: sex and social status differences and temporal variation. *Behavioral Ecology* 22: 594-600 DOI: 10.1093/beheco/arr021
- 2) **Levesque, D.L.** and G.J. Tattersall. 2010. Seasonal torpor and normothermic energy metabolism in the Eastern chipmunk (*Tamias striatus*). *Journal of Comparative Physiology B* 180: 279-292. DOI: 10.1007/s00360-009-0405-x
- 1) **Levesque, D.L.** and G.J. Tattersall. 2009. Seasonal changes in thermoregulatory responses to hypoxia in normothermic Eastern chipmunks (*Tamias striatus*). *Journal of Experimental Biology* 212: 1801-1810. DOI: 10.1242/jeb.027094

**Book Chapters**

- Canale, C.I., **D.L. Levesque (joint first author)**, and B.G. Lovegrove. 2012. Tropical heterothermy — does the exception prove the rule or force a re-definition? In: Ruf T, Bieber C, Arnold W, Millesi E (eds) *Living in A Seasonal World: Thermoregulatory and Metabolic Adaptations*. Springer. pp 29-40. DOI: 10.1007/978-3-642-28678-0\_3

**Scientific Communication in Peer Reviewed Journal****Outside JEB (Journal of Experimental Biology)**

- Levesque, D.L.** 2015. Going torpid to pass through hard times. 218:3348.
- Levesque, D.L.** 2015. Some hibernating bats like it hot. 218: 1978. DOI: 10.1242/jeb.112508
- Levesque, D.L.** 2015. Taking the long way saves energy for high flying birds. 218:1279.  
DOI: 10.1242/jeb.112193
- Levesque, D.L.** 2015. Lizard colour changes to a daily rhythm. 218:331-332. DOI:  
10.1242/jeb.112060
- Levesque, D.L.** 2014. Energy availability drives timing of moult in a songbird. 217:3772  
DOI:10.1242/jeb.095117
- Levesque, D.L.** 2014. Hidden capacity for water preservation in mammals. 217:2026. DOI:  
10.1242/jeb.094995
- Levesque, D.L.** 2014. Low energy use fuels a slow existence. 217:1422-1423.  
DOI:10.1242/jeb.094847
- Levesque, D.L.** 2014. Getting fatter to stay warm. 217: iv DOI:10.1242/jeb.094722

**Conference Presentations \*indicates student presenter**

- Levesque, D.L.** 2018. Tropical thermoregulatory phenotypes: insights into the relationship between basal metabolism and energetic outputs in mammals. *Society for Integrative and Comparative Biology Meeting*, San Francisco, California, USA.
- Hensley, V.R.\* and **D.L. Levesque**. 2018. Squirrels on the move: The response of Southern flying squirrels (*G. volans*) to rising ambient temperatures. *Society for Integrative and Comparative Biology Meeting*, San Francisco, California, USA (Poster presentation).
- Levesque, D.L.**, A.A. Tuen and B.G. Lovegrove. 2017. Life in the warm: Comparative energetics of a nocturnal and a diurnal tropical small mammal. *12<sup>th</sup> International Mammalogical Congress*, Perth, Australia (Oral presentation).
- Thonis, A.\* , R.M. Ceballos, A.A. Tuen, **D.L. Levesque**. 2017. Small, hot, and fuzzy - high upper critical limits and a large thermoneutral zone in a small tropical mammal. *Society for Integrative and Comparative Biology Meeting*, New Orleans, Louisiana, USA (Poster presentation).
- Levesque, D.L.**, B.J. McGill, A. Menzies, M. Landry-Cuerrier, G. Larocque, M.M. Humphries. 2017. Embracing heterothermic diversity: an analytical approach for comparing and categorizing patterns of temperature. *Society for Integrative and Comparative Biology Meeting*, New Orleans, Louisiana, USA (Oral presentation).
- Levesque, D.L.**, B.J. McGill, A. Menzies, M. Landry-Cuerrier, M.M. Humphries. 2016. Embracing heterothermic diversity: an analytical approach for comparing and categorizing patterns of temperature. *15<sup>th</sup> International Hibernation Symposium*, Las Vegas, Nevada, USA (Oral presentation).

- Tattersall, G.J. (presenter), **D.L. Levesque**, J.A. Chaves, and R.M. Danner. 2016. Absolute difference sum approach for estimating movement artifacts in thermal imaging videos. *15th International Hibernation Symposium*, Las Vegas, Nevada, USA (Poster).
- Levesque, D.L.**, A.A. Tuen and B.G. Lovegrove. 2016. Staying hot to fight the heat- High body temperatures in a tropical small mammal. *Society for Integrative and Comparative Biology Meeting*, Portland, Oregon, USA (Oral presentation).
- Levesque, D.L.**, A.A. Tuen and B.G. Lovegrove. 2015. Basoendothermy: Schrödinger's legacy. *International Congress for Comparative Physiology and Biochemistry*. Krakow, Poland (Oral presentation).
- Levesque, D.L.**, M.O. Mowoe, and B.G. Lovegrove. 2015. Hyperthermic torpor? A test using two arid-zone Afrotropical rodents. *Society for Experimental Biology Meeting*, Prague, Czech Republic (Oral presentation).
- Levesque, D.L.** and B.G. Lovegrove. 2013. Reproduction and the evolution of endothermy — Increased homeothermy in reproductively active female greater hedgehog tenrecs (*Setifer setosus*). *Society for Integrative and Comparative Biology Meeting*, San Francisco, California, USA (Oral presentation).
- Levesque, D.L.**, C.I. Canale, C.I. and B.G. Lovegrove. 2012. Tropical heterothermy — Does the exception prove the rule or force a re-definition? *14th International Hibernation Symposium*, Semmering, Austria (Oral presentation).
- Levesque, D.L.** and B.G. Lovegrove. 2011. Increased homeothermy during gestation in a heterothermic mammal, the greater hedgehog tenrec, *Setifer setosus*. *Canadian Society of Zoologist Meeting*, Ottawa, Ontario, Canada (Oral presentation).
- Levesque, D.L.** and G.J. Tattersall. 2008. Seasonal differences in thermoregulation and response to hypoxia in a food storing hibernator. *The 13<sup>th</sup> International Hibernation Symposium*, Swakopmund, Namibia (Poster).
- Levesque, D.L.**, V. Cadena and G.J. Tattersall. 2008. A thermographic characterisation of arousal from torpor in the eastern chipmunk (*Tamias striatus*). *The 13<sup>th</sup> International Hibernation Symposium*, Swakopmund, Namibia (Poster).
- Levesque, D.L.** and G.J. Tattersall. 2008. Thermoregulatory and behavioural responses to hypoxia in the Eastern chipmunk (*Tamias striatus*). *Canadian Society of Zoologist Meeting*, Halifax, Nova Scotia, Canada (Oral presentation).
- Cadena, V. (presenter), **D.L. Levesque** and G.J. Tattersall. 2008. A thermographic characterization of arousal from torpor in the Eastern Chipmunk (*Tamias striatus*). *Canadian Society of Zoologist Meeting*, Halifax, Nova Scotia, Canada (Oral presentation).
- Levesque, D.L.**, P. Brice and G.C. Grigg. 2007. Thermoregulatory responses of the short-beaked echidna (*Tachyglossus aculeatus*) to a range of constant temperatures: A re-evaluation of the thermal neutral zone. *Northeast Biological Graduate Student Conference*, Halifax, Nova Scotia, Canada (Oral presentation).

### Invited Talks

- Levesque, D.L.** 2018. *Mammalian Thermoregulatory Phenotypes: Clues for Deciphering the Past and Predicting the Future*. Department of Biology, Bates College, Lewiston, ME, USA (Feb 2018), Department of Ecology & Evolutionary Biology, University of

Tennessee, Knoxville (March 2018).

**Levesque, D.L.** 2017. *Small Mammals and Climate from an Evolutionary and Ecophysiological Perspective*. Department of Biology, Oklahoma University, Norman, OK, USA.

**Levesque, D.L.** 2017. *Small Mammals and Climate from an Evolutionary and Ecophysiological Perspective*. Climate Change Institute, University of Maine, Orono, ME, USA.

**Levesque, D.L.** 2016. *Mammals do not have constant body temperatures; causes and consequences*. Department of Biological Sciences, University of New Hampshire, Durham, NH, USA.

**Levesque, D.L.** 2015. *The Galapagos — a physiologist's adventures in a zoogeographical paradise*. Institute of Biodiversity and Environmental Conservation, Universiti Malaysia Sarawak, Kuching, Malaysia.

Danner, R. (presenter), J. Chaves, K.D. Schuppe, **D.L. Levesque** and G.J. Tattersall. 2014. *Biología Térmica y el papel del pico en la pérdida de calor y conservación de agua en los Pinzones de Darwin*. Charles Darwin Research Station, Santa Cruz, Galapagos, Ecuador.

**Levesque, D.L.** 2009. *Lifestyles of the not so cold and fuzzy*. University of Ottawa, Ottawa, Canada.

**Levesque, D.L.** 2009. *Life in the field and Introduction to temperature regulation and hibernation*. Hillcrest High School, Ottawa, Canada

### Current Collaborations

- Dr Michael Ceballos (U Arkansas). *NSF RCN Food, Energy, Water, Ecosystem Resources. Biodiversity in the Mekong Basin. NSF REU site #1659858 REU Site: Indigenous America to Indigenous Mekong - Adventures in Biology and Biodiversity: undergraduate student research in South-East Asia.*
- Dr Frank van Breukelen (U Las Vegas Nevada), Professor Loren Buck (U Northern Arizona). *Physiology of the tenrecidae of Madagascar: Life history and adaptive radiations in a hypervariable environment.*
- Dr Alexander Gerson (U Mass Amherst), Dr Justin Boyles (Southern Illinois U). *Phylogenetic, ecological, and environmental drivers of thermoregulatory phenotypes in endotherms.*
- Professor Andrew Alek Tuen (U Malaysia Sarawak). *Thermoregulation of small mammals in the tropics of Southeast-Asia*
- Professor Barry Lovegrove (U KwaZulu-Natal). *Basoendothermy and the evolution of endotherm., Thermoregulatory consequences of fat storage in armored mammals.*
- Dr Ray Danner (Tulane University), Professor Glenn Tattersall (Brock University) and the Dr Jaime Chavez (Universidad San Francisco de Quito). *Thermal consequences of beak size variation in Darwin's Finches.*

### Teaching Experience

- **Lecturer**, *University of Maine* (2016-present). Instructor for BIO433 Mammalogy, BIO200 Biology of Organisms, BIO597 Special Topics- Thermal Ecology (Fall 2016) and One Health and the Environment (Fall 2017), and BIO388 Research Capstone.

- **Guest Lecturer and Mentor**, *Universiti Malaysia Sarawak* (2014 - 2015). Presented seminars to upper level undergraduate and post-graduate students on “*Seeing the Bigger Picture- What is Good Science?*” and “*How to PowerPoint - Tips and Tricks for Giving Effective Scientific Presentations*”.
- **Guest Lecturer**, *University of KwaZulu-Natal, Pietermaritzburg, South Africa* (2012). Presented four lectures on Cenozoic mammals and the evolution of endothermy for a second year undergraduate course, BIOL 222 (Vertebrate Biology).
- **Demonstrator**, *University of KwaZulu-Natal, Pietermaritzburg, South Africa* (2012). Assisted with lab demonstrations and the marking of a major assignment for BIOL 324 (Evolutionary Animal Physiology) and BIOL 222 (Vertebrate Biology).
- **Teaching Assistant**, *Brock University, Canada* (2006 - 2008). Assisted with lab demonstrations and the marking of assignments for BIOL3P96 (Biometrics) and BIOL3P92 (Developmental Biology).

### Mentoring

- **Academic advisor**, *University of Maine* (2015-ongoing). Advised two capstone students in the fall of 2016. Currently advising two MSc students (SBE and EES), one 4+1 student, and four capstone students (BIO388).
- **Advisor**, *NSF REU Site Indigenous America to Indigenous Borneo-Adventures in Biology and Biodiversity* (2016-2017). Supervised the data collection and analysis for a project by three REU students. Resulted in one poster presentation and a manuscript in preparation.
- **Mentor**, *Universiti Malaysia Sarawak* (2014 - 2015). Founded and facilitated an ongoing weekly journal club for post-graduate students.
- **Academic supervisor**, *Universiti Malaysia Sarawak* (2014 – 2015). Primary supervisor for a final year undergraduate project (“The Effects of Forest Types and Canopy Cover on the Thermal Environment of Treeshrews”).
- **Academic co-supervisor**, *University of Antananarivo, Madagascar* (2010 - 2012). Mentored and co-supervised three Diplome d’Études Avancées students (equivalent to an MSc) students from the University of Antananarivo (Madagascar) in the field.

### Reviewing

Axios Review, Biology Letters, Comparative Biochemistry and Physiology -Part A, Frontiers Physiology, Functional Ecology, Journal of Avian Biology, Journal of Animal Ecology, Journal of Comparative Physiology B, Journal of Experimental Biology, Journal of Thermal Biology, Integrative Zoology, Mammalian Biology, Mammal Review, National Science Center Poland, National Science and Engineering Research Council (Canada), National Science Foundation (panel service), Nature Communications, Physiological and Biochemical Zoology, Physiology & Behavior, PLoS ONE

### Affiliations

Canadian Society of Zoologists (2007-present), Society for Integrative and Comparative Biology (2013-present), Society for Experimental Biology (2015-present), British Ecological Society (2017-present)