

## KATHLEEN M. MUNLEY

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**Current Position:** Graduate Research Associate, Indiana University (2016-Present)

### **EDUCATION:**

- 2016-Present Ph.D. **Evolution, Ecology and Behavior, Indiana University**  
Specialization: Behavior/Physiology  
Minor: Neural Science  
*Mentor: Gregory E. Demas*
- 2013 B.S. **Marine Biology, University of Miami**  
Minor: Chemistry  
*Mentor: Martin Grosell*
- 2013 B.A. **Creative Writing, University of Miami**

### **RESEARCH INTERESTS:**

- Neural and hormonal modulation of social behavior
- Physiological mechanisms underlying seasonal adaptations and changes in behavior
- Novel neuroendocrine mechanisms of aggression

### **RESEARCH POSITIONS:**

- 2016-Present **Graduate Research Associate;** Department of Biology, Indiana University.  
Project title: Neuroendocrine modulation of seasonal aggression in Siberian hamsters (*Phodopus sungorus*). *Mentor: Gregory E. Demas.*
- 2013-2016 **Graduate Research Assistant;** Department of Biological Sciences, Louisiana State University. Project title: Regulation of polyamine and GABA production in killifish (*Fundulus species*) during acute hypoosmotic challenge. *Principal Investigator: Fernando Galvez.*
- 2010-2013 **Undergraduate Research Assistant;** Department of Marine Biology and Ecology, University of Miami.  
Project titles: Intestinal transport physiology and calcium carbonate production in response to changing CO<sub>2</sub> levels in the Gulf toadfish (*Opsanus beta*); the effect of prolonged lead exposure on growth, survival, and reproduction of the freshwater pulmonate snail, *Lymnaea stagnalis*. *Mentor: Martin Grosell.*

### **PUBLICATIONS:**

Google Scholar h-index: 4; i10-index: 3; total citations: 69

\* denotes mentored undergraduate students

### **Peer-Reviewed Manuscripts (7)**

**Munley, K. M.,** Deyoe, J. E., Ren, C. C.\*, & Demas, G. E. (2020). Melatonin mediates seasonal transitions in aggressive behavior and circulating androgen profiles in male Siberian hamsters. *Hormones and Behavior*, 117, 104608.

Ren, C. C.\*, Sylvia, K. E., **Munley, K. M.**, Deyoe, J. E., Henderson, S. G.\*, Vu, M. P.\*, & Demas, G. E. Photoperiod modulates the gut microbiome and aggressive behavior in Siberian hamsters. *Journal of Experimental Biology*, In Press.

**Munley, K. M.**, Rendon, N. M., & Demas, G. E. (2018). Neural androgen synthesis and aggression: insights from a seasonally breeding rodent. *Frontiers in Endocrinology*, 9, 136.

Heuer, R. M., **Munley, K. M.**, Narsinghani, N., Wingar, J., Mackey, T. M., & Grosell, M. (2016). Changes to intestinal transport physiology and carbonate production at various CO<sub>2</sub> levels in a marine teleost, the Gulf toadfish (*Opsanus beta*). *Physiological and Biochemical Zoology*, 89, 402-416.

Stickle, W. B., Lindeberg, M., Rice, S. D., **Munley, K. M.**, & Reed, V. (2016). Seasonal changes in the thermal regime and gastropod tolerance from the rocky intertidal zone in southeast Alaska. *Journal of Experimental Marine Biology and Ecology*, 482, 56-63.

**Munley, K. M.**, Brix, K. V., Panlilio, J., Deforest, D. K., & Grosell, M. (2013). Growth inhibition in early life-stage tests predicts full life-cycle toxicity effects of lead in the freshwater pulmonate snail, *Lymnaea stagnalis*. *Aquatic Toxicology*, 128-129, 60-66.

Brix, K. V., Esbaugh, A. J., **Munley, K. M.**, & Grosell, M. (2012). Investigations into the mechanism of lead toxicity to the freshwater pulmonate snail, *Lymnaea stagnalis*. *Aquatic Toxicology*, 106-107, 147-156.

### **Invited Book Chapters (1)**

Jalabert, C., **Munley, K. M.**, Demas, G. E., & Soma, K. K. (2018). Aggressive behavior. In M. K. Skinner (Ed.), *Encyclopedia of Reproduction* (2<sup>nd</sup> ed., Vol. 1, pp. 242-247). Amsterdam: Elsevier.

### **Works in Progress (3)**

**Munley, K. M.**, Trinidad, J. C., Deyoe, J. E., Adaniya, C. H.\*, Nowakowski, A. M.\*, Ren, C. C.\*, Murphy, G. V.\*, Reinhart, J. M.\*, & Demas, G. E. (*anticipated submission: Spring 2020*). Seasonal variation in neurosteroid profiles are associated with territorial aggression in male Siberian hamsters. *Proceedings of the Royal Society B: Biological Sciences*.

**Munley, K. M.**, Whitehead, A., Liu, D., & Galvez, F. (*anticipated submission: Spring 2020*). Upregulation of polyamine and  $\gamma$ -aminobutyric acid (GABA) production are indicative of osmotic plasticity in killifish (*Fundulus sp.*). *Journal of Experimental Biology*.

Rendon, N. M., Petersen, C. L., **Munley, K. M.**, Amez, A. C., Boyes, D. L., Kingsbury, M. A., & Demas, G. E. (*anticipated submission: Spring 2020*). Seasonal patterns of melatonin secretion alter aggressive phenotypes of female Siberian hamsters. *Proceedings of the Royal Society B: Biological Sciences*.

### **Thesis**

**Munley, K. M.** (2013). Growth inhibition in early life-stage tests predicts full life-cycle toxicity effects of lead in the freshwater pulmonate snail, *Lymnaea stagnalis*. *Senior Undergraduate Honors Thesis, University of Miami, Coral Gables, FL. 7 pp.*

### **PRESENTATIONS:**

**Conference Presentations and Published Abstracts (15)**

- Munley, K. M.**, Deyoe, J. E., Adaniya, C. H.\*, Nowakowski, A. M.\*, Ren, C. C.\*, Murphy, G. V.\*, Reinhart, J. M.\*, & Demas, G. E. (2020). Melatonin modulates seasonal changes in neurosteroid levels and territorial aggression in male Siberian hamsters (*Phodopus sungorus*). *Society for Integrative and Comparative Biology*; Austin, TX.
- Munley, K. M.**, Deyoe, J. E., Adaniya, C. H.\*, Nowakowski, A. M.\*, Ren, C. C.\*, Murphy, G. V.\*, Reinhart, J. M.\*, & Demas, G. E. (2019). Melatonin regulates seasonal variation in neurosteroid profiles and aggressive behavior in male Siberian hamsters. *Neuroscience 2019*; Chicago, IL.
- Munley, K. M.**, Deyoe, J. E., Adaniya, C. H.\*, Nowakowski, A. M.\*, Ren, C. C.\*, Murphy, G. V.\*, Reinhart, J. M.\*, & Demas, G. E. (2019). Melatonin facilitates seasonal changes in steroidogenesis and aggressive behavior in male Siberian hamsters. *Society for Behavioral Neuroendocrinology*; Bloomington, IN.
- Morrison, E. A., **Munley, K. M.**, Shortridge, A. L.\*, Canabal, D. N.\*, & Demas, G. E. (2019). Fecal transplantation alters circulating cortisol of male and female Siberian hamsters. *Society for Behavior Neuroendocrinology*; Bloomington, IN.
- Morrison, E. A., **Munley, K. M.**, Shortridge, A. L.\*, Canabal, D. N.\*, & Demas, G. E. (2019). Fecal transplantation alters circulating cortisol of male and female Siberian hamsters. *Purdue University Microbiome Symposium*; West Lafayette, IN.
- Munley, K. M.**, Deyoe, J. E., Ren, C. C.\*, & Demas, G. E. (2019). Rising to the challenge: Melatonin modulates circulating androgens and aggression in a seasonally breeding rodent. *Animal Behavior Conference*; Bloomington, IN.
- Munley, K. M.**, Deyoe, J. E., Ren, C. C.\*, & Demas, G. E. (2019). Melatonin mediates seasonal transitions in circulating androgen profiles and aggression in male Siberian hamsters. *Society for Integrative and Comparative Biology*; Tampa, FL.
- Munley, K. M.**, Deyoe, J. E., Jalabert, C., Ma, C., Ren, C. C.\*, Soma, K. K., & Demas, G. E. (2018). Effects of melatonin on seasonal shifts in androgen levels and aggression in male Siberian hamsters. *International Congress of Neuroendocrinology*; Toronto, Canada.
- Munley, K. M.**, Deyoe, J. E., Jalabert, C., Ma, C., Ren, C. C.\*, Soma, K. K., & Demas, G. E. (2018). Effects of melatonin on seasonal shifts in androgen levels and aggression in male Siberian hamsters. *Animal Behavior Conference*; Bloomington, IN.
- Ren, C. C.\*, Deyoe, J. E., Sylvania, K. E., **Munley, K. M.**, & Demas, G. E. (2018). Photoperiod modulates gut microbiome and behavior in Siberian hamsters (*Phodopus sungorus*). *Animal Behavior Conference*; Bloomington, IN.
- Munley, K. M.**, Whitehead, A., Liu, D., & Galvez, F. (2017). Upregulation of polyamine biosynthesis and  $\gamma$ -aminobutyric acid (GABA) production are indicative of osmotic plasticity in killifish (*Fundulus sp.*). *Animal Behavior Conference*; Bloomington, IN.
- Munley, K. M.**, Liu, D., & Galvez, F. (2014). The roles of glutamate and putrescine in  $\gamma$ -aminobutyric acid (GABA) synthesis in *Fundulus heteroclitus* during osmotic stress. *American Physiological Society Intersociety Meeting: Comparative Approaches to Grand Challenges in Physiology*; San Diego, CA.

Heuer, R. M., **Munley, K. M.**, Narsinghani, N., Wingar, J., Mackey, T., & Grosell, M. (2014). Changes to intestinal transport physiology at varying levels of hypercapnia in the Gulf toadfish (*Opsanus beta*). *American Physiological Society Intersociety Meeting: Comparative Approaches to Grand Challenges in Physiology*; San Diego, CA.

Heuer, R. M., **Munley, K. M.**, Narsinghani, N., & Grosell, M. (2014). Influence of hypercapnia on intestinal transport and calcium carbonate formation in the Gulf toadfish. *International Congress on the Biology of Fish*; Edinburgh, Scotland.

**Munley, K. M.** (2013). Growth inhibition in early life-stage tests predicts full life-cycle toxicity effects of lead in the freshwater pulmonate snail, *Lymnaea stagnalis*. *Atlantic Coast Conference Meeting of the Minds*; Winston Salem, NC.

#### **Other Presentations (4)**

**Munley, K. M.** (2019). Aggression and the seasonal clock: Unwinding the actions of melatonin on aggressive behavior in a seasonally breeding rodent. *Indiana University Evolution, Ecology, and Behavior Brown Bag Seminar Series*; Bloomington, IN.

Ren, C. C.\*, Deyoe, J. E., Sylvia, K. E., **Munley, K. M.**, & Demas, G. E. (2018). Photoperiod modulates gut microbiome and behavior in Siberian hamsters (*Phodopus sungorus*). *Indiana University Hutton Honors College Research Symposium*; Bloomington, IN.

**Munley, K. M.**, Liu, D., & Galvez, F. (2015). From salinity to behavior: the effect of osmotic stress on GABA production in the killifish, *Fundulus heteroclitus*. *Louisiana Environmental Education Symposium*; Baton Rouge, LA.

**Munley, K. M.**, Liu, D., & Galvez, F. (2014). The roles of glutamate and putrescine in  $\gamma$ -aminobutyric acid (GABA) synthesis in *Fundulus heteroclitus* during osmotic stress. *Louisiana State University BioGrads Symposium*; Baton Rouge, LA.

#### **RESEARCH GRANTS AND FELLOWSHIPS (\$66,892):**

2019	Research Award, Indiana University Graduate and Professional Student Government (\$1,000)
2019	Indiana Academy of Science (IAS) Senior Research Grant (\$3,000)
2019	Society for Integrative and Comparative Biology (SICB) Grant-in-Aid of Research (\$1,000)
2019, 2018	NIH Ruth L. Kirschstein NRSA Institutional (T32) Predoctoral Fellowship: "Common Themes in Reproductive Diversity" (2 yrs.); Center for the Integrative Study of Animal Behavior, Indiana University (\$48,192)
2016	Research Recruitment Fellowship (1 sem.); Department of Biology, Indiana University (\$12,500)
2014	University Grant Finalist; Louisiana Environmental Education Commission, Louisiana Department of Wildlife and Fisheries (\$1,200)

#### **HONORS, AWARDS, AND SCHOLARSHIPS:**

2020	Nominee, Aubrey Gorbman Award for Best Student Oral Presentation; Division of Comparative Endocrinology, Society for Integrative and Comparative Biology (SICB)
2020	Charlotte Magnum Student Support Program Award; Society for Integrative and Comparative Biology (SICB)

2019, 2018	Center for the Integrative Study of Animal Behavior (CISAB) Travel Grant; Indiana University (\$1,250)
2019, 2018	Provost's Travel Award for Women in Science; Indiana University (\$1,200)
2018	Trainee Travel Award; International Neuroendocrine Federation (\$485)
2018	College of Arts and Sciences Fall Travel Award; Indiana University (\$200)
2018	Enrichment Travel Award; Department of Biology, Indiana University (\$250)
2014	Travel Grant; Graduate Student Association, Louisiana State University (\$200)
2013	Graduated <i>cum laude</i> with departmental honors distinction in Marine and Atmospheric Science Program (B.S.) and <i>summa cum laude</i> in Creative Writing Program (B.A.), University of Miami. Made Provost's Honor Roll and/or Dean's List for 7 out of 8 semesters (B.S. GPA = 3.516, B.A. GPA = 4.0, cumulative GPA = 3.628).
2009-2013	Recipient; University Scholarship, University of Miami (\$24,000/yr.)

### **RESEARCH SKILLS:**

- **Animal behavior**
  - Sampling techniques: focal individuals, time
  - Assays: resident-intruder paradigm, open field test
  - Types of behavior: aggression, territoriality, investigation, scent marking, self-grooming, submissive behaviors, anxiety-like behaviors
- **Husbandry** – maintain and breed colony of Siberian hamsters, maintain fish and aquatic invertebrate aquaria, develop IACUC protocols and standard operating procedures
- **Surgical Experience** – stereotaxic surgery, lentiviral vector microinjections into adrenal glands and brain, perfusions
- Rodent and fish handling and live sampling
- Perform necropsies and collect blood and tissue samples from rodents, fishes, and aquatic invertebrates at various life-history and developmental stages
- **Tissue processing** – sectioning (cryostat and freezing microtome), micropunching
- **In vitro laboratory assays** – steroid hormone extraction from blood, serum, and tissue samples (solid phase extraction using C18 columns and OMIX C18 pipette tips), liquid chromatography-tandem mass spectrometry (LC-MS/MS), enzyme immunoassays (EIAs), high performance liquid chromatography (HPLC), atomic absorption spectrophotometry, anion chromatography, fluorescence spectroscopy
- **Molecular biology** – RNA extraction (TRIzol and automated extraction methods), RNA quantification, cDNA synthesis, primer design, PCR, gel electrophoresis, qPCR
- **Histology and Microscopy** – immunocytochemistry, Nissl staining
- **Statistical analysis**
  - Programs: R, SigmaStat, SigmaPlot, PoloPlus
  - Analyses: Simple and multiple linear regressions, general linear mixed models, t-tests, analyses of variance, non-parametric tests of group differences (Mann-Whitney U test, Kruskal-Wallis test, Friedman test), principal component analysis, analysis of categorical variables

### **TEACHING AND MENTORING EXPERIENCE:**

2018	<b>Associate Instructor; Center for the Integrative Study of Animal Behavior, Indiana University</b> – Research and Professional Ethics for the Bio-behavioral Sciences (ABEH-A 502).
2018	<b>Mentor, Research Experience for Undergraduates (REU) Program in Animal Behavior; Center for the Integrative Study of Animal Behavior, Indiana University</b> – Mentored 2 undergraduate students conducting independent research projects in the Demas lab.

***CISAB REU Program in Animal Behavior Students Mentored (2):***

Desirée Nieves Canabal (University of Puerto Rico at Mayagüez, 2018)

*Project Title: Fecal transplantation and the role of the gut microbiome in aggressive behavior*

Ayley Shortridge (Michigan State University, 2018)

*Project Title: Modulation of the HPA axis and anxiety-like behavior following fecal transplantation in Siberian hamsters*

2017-Present **Mentor, Indiana University** – Mentored 1 undergraduate student conducting an independent research project in the Demas lab and supervised and taught techniques to 6 undergraduate research assistants in the Demas lab.

***Indiana University Undergraduate Students Mentored (1):***

Clarissa Ren (Hutton Honors College Research Program, 2017-2019)

*Project Title: Photoperiod modulates the gut microbiome and behavior in Siberian hamsters*

***Indiana University Undergraduate Research Assistants Mentored (11):***

Kate Adaniya (2018-Present, Cox Scholars Program); Taylor Deckard (2019-Present); Eamonn Duffy (2019-Present, Hutton Honors College); Sarah Henderson (2017-Present, Cox Scholars Program); Cameron Logan (2017-2019); Caroline McCord (2019-Present, Hutton Honors College); Grace Murphy (2018-Present, Hutton Honors College); Andi Nowakowski (2018-Present, Hutton Honors College); Molly Pendergast (2019-Present, Hutton Honors College); John Reinhart (2018-2019); Michael Vu (2017-2019).

2016-2017 **Assistant Instructor; Department of Biology, Indiana University** – Integrative Human Physiology (BIOL-P 451) and Biology Laboratory (BIOL-L 113) undergraduate courses.

2015 **Guest Instructor; Department of Biology, University of Washington** – Presented lecture in Survey of Physiology (BIOL 118) undergraduate course.

2014 **Content Tutor; Cox Communications Academic Center for Student-Athletes, Louisiana State University** – General Biology (BIOL 1001), General Chemistry I (CHEM 1201), General Chemistry II (CHEM 1202), and Introduction to Oceanography (OCS 1005) undergraduate courses. Received College Reading & Learning Association (CRLA) 1 certification.

2013-2016 **Mentor, Louisiana State University** – Supervised and taught techniques to 5 undergraduate research assistants in the Galvez lab.

***Louisiana State University Undergraduate Research Assistants Mentored (5):***

Jamie Drummond (2014-2016); Ryan Hoffman (2015-2016, Roger Hadfield Ogden Honors College); Brittney Keosayasing (2015-2016); Christina Rubio (2015-2016, Roger Hadfield Ogden Honors College); Veronica Rubio (2014-2016, Initiative for Maximizing Student Development).

2013-2016 **Teaching Assistant; Department of Biological Sciences, Louisiana State University** – Vertebrate Physiology Laboratory (BIOL 4161) and Marine Communities Laboratory (BIOL 4263) undergraduate courses.

**OUTREACH:**

2019-Present **Volunteer, Skype a Scientist** – Speaks with elementary, middle, and high school students from across the world about research and career as a scientist via Skype.



2019 **Graduate Mentor, Jim Holland Summer Science Research Program (SSRP); Department of Biology, Indiana University** – Mentored 1 high school student conducting an independent research project in the Demas lab.

***Jim Holland SSRP Students Mentored (1):***

Kennedi Cole (Hammond Academy of Science and Technology, 2019)

*Project Title: Sex differences in seasonal aggression in male and female Siberian hamsters*

2018, 2017 **Instructor, Foundations in Science and Mathematics Program; College of Arts and Sciences, Indiana University** – Designed and taught Zoology (Animal Diversity) course to local middle and high school students in the greater Bloomington area.

2018, 2017 **Abstract judge, Outstanding Junior Scientist Competition; Indiana Junior Academy of Science** – Evaluated abstracts submitted by high school students across the state of Indiana that conducted independent research projects.

2019, 2018 **Volunteer, Science Fest; College of Arts and Sciences, Indiana University** – Organized and led hands-on activities and demonstrations for children and adults in the greater Bloomington community.

2016

2017-Present **Recruitment Chair, Associate Editor, Copy Editor, and Writer; SciU Blog, Indiana University** – Organizes and coordinates events to recruit new writers and editors and composes and edits bimonthly blog posts about cutting-edge science and current events at the Indiana University Bloomington campus. Website: <http://blogs.iu.edu/sciu/>.

2017 **Guest Speaker; STEM Research Bootcamp, Indiana University** – Lead workshop on writing abstracts and poster presentations for undergraduate STEM research boot camp hosted by the Groups and Hudson & Holland Scholars programs.

2014-2015 **Graduate Mentor, EnvironMentors Program; College of the Coast & Environment, Louisiana State University** – Mentored 1 high school student in conducting an independent research project and designing and presenting a scientific poster at the LSU EnvironMentors Science Fair.

***LSU EnvironMentors Program Students Mentored (1):***

De'Marcus Goins\*, Scotlandville Magnet High School (2014-2015)

*Project Title: Whodunnit: Investigations into the eating preferences of carnivorous plants*

*\* Was awarded 1<sup>st</sup> place at the LSU EnvironMentors Science Fair and 3<sup>rd</sup> place at the EnvironMentors National Fair in Washington, D.C., earning himself an \$800 college scholarship.*

2014 **Graduate Mentor, Biology Intensive Orientation for Students (BIOS); College of Science, Louisiana State University** – Mentored incoming freshman undergraduate students during a summer biology boot camp program, which helps students make the transition to the expectations of college prior to the start of their first semester.

2014 **Volunteer, Ocean Commotion; Louisiana Sea Grant** – Organized and led hands-on activities for children in the greater Baton Rouge community.

2013 **Instructor, High School Careers in Medicine Workshop; Miller School of Medicine, University of Miami** – Designed and taught Introduction to Physiology course to rising high school seniors from underrepresented backgrounds in the Miami-Dade County Public School system.

**PROFESSIONAL ACADEMIC SERVICE AND RELEVANT EXPERIENCE:**

2019-Present Social Media Coordinator and Founding Member, Evolution, Ecology, and Behavior Organization Representing Graduate Students (EEB ORG) at Indiana University

2019 Session Moderator, Animal Behavior Conference – “Physiological Effects of Stress.”

- 2019 Session Chair, Society for Integrative and Comparative Biology Annual Meeting –  
“Hormones & Behavior II: Everything but the Birds.”
- 2019, 2018 Hospitality Committee Chair, Animal Behavior Conference.
- 2018 Session Moderator, Animal Behavior Conference – “Sex Differences in the Brain and  
Behavior.”
- 2017-Present **Ad Hoc Reviewer** – *Hormones and Behavior; Journal of Experimental Zoology, Part A;*  
*Journal of Mammalogy.*
- 2017-Present Graduate Recruitment Weekend planning committee, Indiana University.

**MEMBERSHIPS IN PROFESSIONAL ORGANIZATIONS:**

Society for Behavioral Neuroendocrinology (SBN); Society for Integrative and Comparative Biology (SICB); Society for Neuroscience (SfN); Animal Behavior Society (ABS); American Physiological Society (APS); Indiana Academy of Science.