

# Christopher B. Cunningham

Lecturer (Assistant Professor)  
Department of Biosciences  
Swansea University  
Swansea, Wales, UK SA2 8PP

Email: [c.b.cunningham@swansea.ac.uk](mailto:c.b.cunningham@swansea.ac.uk)  
Office: +44.01792.513247  
Website: [Cunningham-lab.netlify.com](http://Cunningham-lab.netlify.com)

## Education & Training

---

- 2012-2016    Post-Doctoral Research Associate, Department of Genetics  
                 University of Georgia, Athens, GA  
                 Advisor: Allen Moore
- 2006-2011    Doctor of Philosophy, Biology  
                 University of Utah (U of U), Salt Lake City, UT  
                 Dissertation Committee: David Carrier (Advisor), Fred Adler, Jon Seger, Wayne  
                 Potts, Elizabeth Cashdan (External)  
                 Dissertation Title: The Behavioral Physiology of Competitive Ability in Recently  
                 Wild-Derived Male House Mice (*Mus musculus*).
- 2003-2006    Baccalaureate (Science), Biology  
                 Belmont Abbey College (BAC), Belmont, NC  
                 Minors: Physics/Mathematics, Chemistry, Allied Health  
                 Honors: *Summa Cum Laude*

## Academic Appointments

---

- 2017-Present    Lecturer (Assistant Professor), Department of Biosciences, Swansea University (SU)

## Professional Appointments

---

- 2017-Present    Associate Editor, Ecology & Evolution  
2017              Welsh Crucible Participant (Research Leadership & Media Training)

## Short Research Statement

---

My research focuses on the evolution and mechanistic basis of behavior. I am specifically interested in social behaviors, such as, parental care and social dominance. My research uses a variety of methods and -omics techniques concentrating on understanding the contributions of genetic, genomic, chemosensory, and molecular elements to social behavior.

## Published Manuscripts in Referred Journals

---

- 2018              **Cunningham CB**, Ji L, McKinney EC, Benowitz KM, Schmitz RJ, Moore AJ. Changes of gene expression but not cytosine methylation are associated with plasticity of male parental care reflecting behavioural state, social context, and individual flexibility. *Journal of Experimental Biology*, jeb.188649.
- 2018              Benowitz KM, McKinney EC, **Cunningham CB**, Moore AJ. Predictable gene

expression related to behavioral variation in parenting. *Behavioural Ecology*, 179.

- 2017 Benowitz KM, McKinney EC, Roy-Zokan EM, **Cunningham CB**, Moore AJ. The role of lipid metabolism during parental care in two species of burying beetle (*Nicrophorus* spp.). *Animal Behaviour* 129, 143-149.
- 2017 Benowitz KM, McKinney EC, **Cunningham CB**, Moore AJ. Relating quantitative variation within a behavior to variation in transcription. *Evolution* 71, 1999-2009.
- 2017 Mehlferber EC, Benowitz KM, Roy-Zokan EM, McKinney EC, **Cunningham CB**, Moore AJ. Duplication and sub/neofunctionalization of *malvolio*, an insect homolog of *Nramp*, in the subsocial beetle *Nicrophorus vespilloides*. *G3: GENES, GENOMES, GENETICS* 7, 3393-3403.
- 2017 **Cunningham CB**, Badgett MJ, Meagher RM, Orlando R, Moore AJ. Ethological principles predict the neuropeptides co-opted to influence parenting. *Nature Communications* 8, 14225.
- 2017 Carrier DR, and **Cunningham CB**. The effect of foot posture on striking, grappling, and rapid turning. *Biology Open* 6, 269-277.
- 2016 **Cunningham CB**, VanDenHeuvel K, Khana D, and Moore AJ. The role of neuropeptide *F* in a transition to parental care. *Biology Letters* 12, 20160158.
- 2015 **Cunningham CB**, Li J, Wiberg A, Shelton J, McKinney EC, Parker DJ, Meagher RB, Benowitz KM, Roy-Zokan E, Ritchie MG, Brown SJ, Schmitz RJ, and Moore AJ. The genome and methylome of a beetle with complex social behavior, *Nicrophorus vespilloides* (Coleoptera: Silphidae). *Genome Biology and Evolution* 12, 3383-3396.
- 2015 Parker DJ, **Cunningham CB**, Walling CA, Stamper CE, Head ML, Roy-Zokan E, McKinney EC, Ritchie MG, and Moore AJ. Transcriptomes of parents help identify parenting strategies and sexual conflict in a subsocial beetle. *Nature Communication* 6, 8449.
- 2015 Roy-Zokan EM, **Cunningham CB**, Hebb LE, McKinney EC, and Moore AJ. Vitellogenin and vitellogenin receptor gene expression is associated with male and female parenting in a subsocial insect. *Proceedings of the Royal Society B: Biological Sciences* 282, rspb.2015.0787.
- 2015 Nelson A\*, **Cunningham CB\***, Ruff JS, and Potts WK. Protein pheromone expression levels predict and respond to the formation of social dominance networks. *Journal of Evolutionary Biology* 28, 1213-1224.   \*= co-first authors
- 2015 **Cunningham CB**, Douthit MK, and Moore AJ. Expression of octopaminergic receptor genes in four non-neural tissues in female *Nicrophorus vespilloides* beetles. *Insect Science* 22, 495-502.
- 2014 **Cunningham CB**, Douthit MK, and Moore AJ. Octopaminergic gene expression and

flexible social behavior in the subsocial burying beetle *Nicrophorus vespilloides*. *Insect Molecular Biology*, 23, 391-404.

- 2013 **Cunningham CB**, Ruff J, Chase K, Potts WK and Carrier DR. Competitive ability in male house mice (*Mus musculus*): Genetics influences. *Behavior Genetics* 43, 151-160.
- 2010 **Cunningham CB**, Schilling N, Anders C and Carrier DR. The influence of foot posture on the cost of transport in humans. *Journal of Experimental Biology* 213, 790-797.
- 2009 Shapiro MD, Summers B, Balabhadra S, Miller A, Aldenhoven J, **Cunningham CB**, Bell MA and Kingsley DM. The genetic architecture of skeletal convergence and sex determination in ninespine sticklebacks. *Current Biology* 19, 1140-1145.

#### Manuscripts in Preparation for Referred Journals (Working Title)

---

- 2017 **Cunningham CB**, Khana D, Carter A, McKinney EC, Moore AJ. Neurotransmitter pathway gene expression changes during a transition into parental care.

#### Research and Academic Grants

---

- 2018 *Identifying the genetic networks of anti-viral immune response of Galleria mellonella*. College of Science Research Fund. Principal Investigator, SU. £4,600.
- 2018 *Development of genetic tools for assessing anti-viral immunity in insect (Galleria mellonella) larvae with MinION sequencing technology*. College of Science Research Fund. Co-Investigator, SU. £2,182.
- 2017 Knowledge Economy Skills Scholarships 2 (KESS2) MRes Scholarship. Principal Investigator. £19,800
- 2016 *Gene expression and its regulation during context-specific social behavior*. Evolutionary, Ecological, or Conservation Genomics Research Award, American Genetics Society. Principal Investigator. \$10,300
- 2010 NSF Young Investigators Travel Grant to attend ICVM- 9 in Uruguay: \$1,000
- 2009 Funding Incentive Seed Grant, Research Assistantship, U of U: \$8,800
- 2008-2012 Charlotte Mangum Student Support Program, Society for Integrative and Comparative Biology (4 awards): \$1,956
- 2008, 2011 Associated Students of the University of Utah Student Travel Award, U of U (2 awards): \$555
- 2007-2012 Department of Biology Graduate Student Travel Award, U of U (5 awards): \$2,000
- 2007-2012 Graduate School Graduate Student Travel Award, U of U (5 awards): \$2,000

#### Fellowships

---

- 2011-2012 NSF GK-12 Educational Outreach Fellowship- Declined
- 2010-2011 NSF GK-12 Educational Outreach Fellowship

#### Research and Academic Honors

---

- 2012 Riser Award for Outstanding Graduate Research, Department of Biology, U of U
- 2006 *Summa Cum Laude* (BAC)
- 2006 Award for Academic Excellence in Biology (BAC)
- 2006 Student of the Year, Mathematics/Physics (BAC)

## **Invited Seminars**

---

2018	University of St. Andrews, Centre for Biological Diversity
2018	Oxford Brookes University, Department of Biological and Medical Sciences
2017	University of Cambridge, Dept. of Zoology
2017	Swansea University, Dept. of Biosciences
2017	University of Bath, Milner Centre for Evolution
2016	Georgia College & State University, Dept. Biological and Environmental Sciences
2012	Belmont Abbey College, Dept. of Biology

## **Graduate Students**

---

2017	Tomas Generalovic – MRes – “The application of solid state chromatin Immunoprecipitation (ChIP) for epigenetic profiling of insects” <ul style="list-style-type: none"><li>- In collaboration with a biotechnology/industrial partner, Provair Science</li><li>- Current: PhD Candidate (Jiggins Lab), University of Cambridge, Dept. of Zoology</li></ul>
------	--

## **Teaching Experience**

---

### Swansea University

2018	Instructor, Department of Biosciences <ul style="list-style-type: none"><li>BIO258 - Animal Physiology</li><li>BIO340 – Professional Laboratory Skills</li><li>BIO350 – Independent Research Project</li></ul>
------	--

### University of Georgia

11 students	Undergraduate Research Supervisor, Department of Genetics <ul style="list-style-type: none"><li>~Direct research supervisor of Honor Thesis/Independent Study Students<ul style="list-style-type: none"><li>- 3 went on to Medical/Physician Assistant School</li><li>- 3 went on to Graduate School</li><li>- 4 have published with me</li></ul></li></ul>
-------------	---

### University of Utah

2011	Teaching Assistant, Department of Biology <ul style="list-style-type: none"><li>Comparative Vertebrate Morphology (1 semester)</li></ul>
2008-2010	Teaching Assistant, Department of Biology <ul style="list-style-type: none"><li>Biology of Aggression (3 semester)</li></ul>
2009	Co-Instructor, Department of Biology <ul style="list-style-type: none"><li>Comparative Physiology Laboratory Lecture (1 semester)</li></ul>
2007-2009	Laboratory Instructor, Department of Biology <ul style="list-style-type: none"><li>Comparative Physiology Laboratory (3 semesters)</li></ul>
5 students	Undergraduate Research Supervisor, Department of Biology <ul style="list-style-type: none"><li>Direct research supervisor of Honor Thesis/Independent Study Students</li></ul>

### Belmont Abbey College

2004-2006	Laboratory Assistant, Department of Biology <ul style="list-style-type: none"><li>~Introduction to Biology Laboratory (4 semesters)</li></ul>
2004-2006	Teaching Assistant, Department of Mathematics <ul style="list-style-type: none"><li>~College Algebra (4 semesters)</li></ul>

### Highland High School (SLC, UT)

2010-2011 NSF GK-12 Educational Outreach Teaching Fellow  
AP Environmental Science

### **Professional and Academic Service**

---

2017-present Administration and maintenance of shared equipment; Dept. of Biosciences, Swansea University

2011-present Referee for *Nature Communications*, *Evolution*, *PLoS ONE*, *Ecology & Evolution*, *Functional Ecology*, *BMC Genomics*, *BMC Biology*, *Proceeding of Royal Society B*, *Giga Science*

2014 Discussion Leader, Genes & Behavior, Gordon Research Conference

2014 Associate Chair, Genes & Behavior, Gordon Research Seminar

2013 Judge- Best Student Presentation, SICB, Division of Animal Behavior

2011 Panel Discussion Member, “What to expect as a TGLL Fellow”, University of Utah, NSF Educational Outreach Fellowship Workshop

2010-2011 Vice-Chair, Graduate Student Advisement Committee, University of Utah, Department of Biology  
~Biology Graduate Student Government Committee

2009-2010 Retention/Promotion/Tenure Committee, University of Utah, Department of Biology  
~Synthesized graduate student experiences and input for professor eligible for R.P.T.  
~Chair, Graduate Student R.P.T. Committee

2008-2009 Graduate Improvement Committee, University of Utah, Department of Biology  
~Co-founded committee to suggest improvements of the graduate program and increase recruiting.

2006-2008 Communication Committee (Graduate Student Representative), University of Utah, Department of Biology  
~Revised rules for inviting speakers for both faculty and graduate student body.

### **Community Outreach**

---

2012-2013 Science Fair Mentor, NorthStar Academy, Salt Lake City: The Genetic Basis of Endurance Running

2010-2011 3 times- Science Fair Judge for Schools in Salt Lake City School District

2011 1 time- Science Fair Judge for Salt Lake District Science Fair