

# Christine Merlin

## *Curriculum vitae*

Department of Biology  
Biological Science Building East, 118C  
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## Positions and Employment

2015- Faculty of Ecology and Evolutionary Biology, Texas A&M University  
2014- Faculty of Neuroscience, Texas A&M University  
2014- Faculty of Genetics, Texas A&M University  
2013- Center for Biological Clocks Research, Texas A&M University, Member  
2013- Assistant Professor, Department of Biology, Texas A&M University  
2007-2013 Postdoctoral Fellow with Dr. Steven Reppert, University of Massachusetts Medical School  
2003-2006 Graduate research with Dr. Emmanuelle Jacquin-Joly and Dr. Martine Maibeche, National Institute of Agronomical Research and University Pierre and Marie Curie, France

## Education

2003-2006 Ph.D., Insect Physiology, University Paris 6 Pierre and Marie Curie, France  
2002-2003 M.S., Invertebrate Physiology, University Paris 6 Pierre and Marie Curie, France  
1998-2002 B.S., Animal Biology, University Paris 6 Pierre and Marie Curie, France

## Honors and Awards

2018 Junior Faculty Research Award, International Society for Research on Biological Rhythms  
2017-2020 Klingenstein-Simons Fellowship Award in Neuroscience  
2011-2013 Charles King Trust Postdoctoral Fellowship, The Medical Foundation  
2009 Hot topic symposium of the XI Congress of the European Biological Rhythms Society  
2009 Travel grant from the French Society of Chronobiology/European Biological Rhythms Society  
2006 Student travel award from the International Chemical Ecology Society  
2003-2006 Ph.D. fellowship from the National Institute of Agronomical Research and Ile-de-France Region  
2002-2003 Fellowship from the French Ministry of National Education

## Professional activities

### Memberships

2016- Member of the Genetics Society of America  
2014- Member of the Society for Research on Biological Rhythms  
2014-2019 Member of the NSF Insect Genetic Technology Network

### Editorial activities

2013- Review Editor, *Frontiers in Ecology and Evolutionary Biology*, *Chemical Ecology*  
2009-2013 Associate member of Faculty of 1000 Biology

### Reviewer activities

#### *Grants*

2018 National Science Foundation, Integrative Organismal Systems, *Ad hoc*  
2017 National Science Foundation, Integrative Organismal Systems, *Ad hoc*  
2015 National Science Foundation, Integrative Organismal Systems, *Ad hoc*  
2015 National Science Foundation, Integrative Organismal Systems, Panelist

*Manuscripts* *Animal Behavior*, *Behavior Genetics*, *Biological Journal of the Linnean Society*, *Cell Reports*, *European Journal of Neuroscience*, *Frontiers in Behavioral Neuroscience*, *Frontiers in Ecology and Evolutionary Biology*, *Gene Technology*, *Insect Molecular Biology*, *Journal of Biological Rhythms*, *Journal of Insect Science*, *Journal of the Lepidopterists' Society*, *Molecular Ecology*, *Proceedings of the National Academy of Sciences*, *PloS One*, *Scientific Reports*.

## Awards

2018 International Society for Research on Biological rhythms meeting, Trainee Merit Awards

## Conference organization

2020 Program Committee Member, Society for Research on Biological Rhythms  
2019 Co-organizer, Texas Society for Circadian Biology and Medicine meeting  
2018 Session Chair, Trainee Development Day, Society for Research on Biological Rhythms  
2016 Co-organizer, Texas Society for Circadian Biology and Medicine meeting  
2014 Session Chair, Society for Research on Biological Rhythms international meeting  
2014 Workshop co-organizer, Trainee Development Day, Society for Research on Biological Rhythms

## Consultant

2015 Book on Monarch butterflies in a series on Bioindicator animals (Red Line Amiral)

## Invited Presentations and Seminars

2019 International Congress of Comparative Physiology and Biochemistry, Invertebrate photoperiodism and seasonality symposium (Ottawa, Canada)  
2019 Chronobiology Gordon Research Conference (Castelldefels, Spain)  
2019 Texas Society for Circadian Biology and Medicine (College Station, TX)  
2018 Journal of Experimental Biology 2018 Symposium, Linking brain and behavior in animal navigation (Cavo Olympo, Greece)  
2017 8<sup>th</sup> Max Planck Institute-Chinese Academy of Sciences Exploratory Round Table Conference on "Mechanisms of Animal Behavior" (Shanghai, China)  
2017 University of Missouri, Division of Biological Sciences, *Invited by Graduate Students*  
2017 UC Davis, Department of Entomology and Nematology  
2017 Texas Genetics Society meeting (College Station, TX)  
2017 Genetics of Migration Symposium (Plön, Germany)  
2017 Center for Circadian Biology Symposium (UC San Diego, CA)  
2016 Texas A&M University, Department of Entomology, *Invited by Graduate Students*  
2016 International Entomology Congress, Evolution of biological clocks Symposium (Orlando, FL)  
2016 Virginia Tech University, Department of Biological Sciences  
2016 Society for Research on Biological Rhythms (Tampa, FL)  
2016 Texas A&M University, Department of Horticultural Sciences  
2015 Texas A&M University, Interdisciplinary Program in Genetics  
2015 Insect Genetic Technology Research Coordination Network, Special symposium on Flies, Monarchs, Mosquitoes: Insights using genetic technologies (Rockville, MD)  
2015 Insect Genetic Technology Workshop, Annual Arthropod Genomics Consortium Symposium (Manhattan, KS)  
2014 Baylor University, Department of Biology  
2014 APS Intersociety Meeting: Comparative Approaches to Grand Challenges in Physiology (San Diego, CA)  
2014 Texas A&M University, Zoology Society  
2014 Southeastern and Central Texas Society for Clocks Meeting (Houston, TX)  
2013 Texas A&M University, Genetic Graduate Student Association  
2013 EFOR network, Genomics and Lepidoptera (Paris, France)  
2013 Behavioural Ecology of Animal Movement, Post-congress Symposium of the 14th International Behavioral Ecology Congress (Lund, Sweden)  
2010 Society for Research on Biological Rhythms (Sandestin, FL)

## Peer-reviewed Publications

***In preparation*** (\*: Graduate students; \*\*: Undergraduate students)1. Williams SE\*, Lugena AB\*, Zhang Y, Hayden A\*\* and **Merlin C.** Photoperiodic control of the vitamin A pathway drives seasonal adaptation in the monarch butterfly.

## Submitted

1. Lugena AB\*, Zhang Y, Menet JS and **Merlin C.** Genome-wide discovery of the daily transcriptome, cis-regulatory elements and transcription factor footprints in the monarch butterfly brain.

**Peer-reviewed articles** (\*: Graduate students; \*\*: Undergraduate students)

16. Zhang Y, Markert MJ\*, Groves SC\*\*, Hardin PE and **Merlin C** (2017) Vertebrate-like CRYPTOCHROME 2 from monarch regulates circadian transcription via independent mechanisms on CLOCK and BMAL1. *Proc Natl Acad Sci USA* 114(36): E7516-E7525.
15. Markert MJ\*, Zhang Y, Enuameh MS, Reppert SM, Wolfe SA and **Merlin C** (2016) Genomic access to monarch migration using TALEN and CRISPR/Cas9-mediated targeted mutagenesis. *G3: Genes, Genomes, Genetics* 6:905-15.  
• Featured in 2016 G3: Genes/Genomes/Genetics Spotlight.
14. **Merlin C\***, Beaver LE, Taylor OR, Wolfe SA and Reppert SM\* (2013) Efficient targeted mutagenesis in the monarch butterfly using Zinc Finger Nucleases. *Genome Research* 23:159-68. \*: Co-corresponding authors.
13. Guerra PA, **Merlin C**, Gegear RJ and Reppert SM (2012) Discordant timing between antennae disrupts sun compass orientation in migratory monarch butterflies. *Nature Communications* 3:958.
12. Zhan S, **Merlin C**, Boore JL and Reppert SM (2011) The monarch butterfly genome yields insights into long-distance migration. *Cell* 147: 1171-1185.
11. Legeai F, Malpel S, Montagné N, Monsempe C, Cousseran F, **Merlin C**, François M-C, Maïbèche-Coisne M, Gavory F, Poulain J and Jacquin-Joly E (2011) An Expressed Sequence Tag collection from the male antennae of the Noctuid moth *Spodoptera littoralis*: a resource for olfactory and pheromone detection research. *BMC Genomics* 12: 86.
10. **Merlin C**, Gegear RJ and Reppert SM (2009) Antennal circadian clocks coordinate sun compass orientation in migratory monarch butterflies. *Science* 325: 1700-1704.
9. Bradley TJ, Briscoe AD, Brady SG, Cardinal S, Contreras HL, Danforth N, Dudley R, Grimaldi D, Harrison JF, Kaiser A, **Merlin C**, Reppert SM, Vanderbrooks JM and Yanoviak SP (2009) Episodes in Insect Evolution. *Integrative and Comparative Biology* 49: 590-606.
8. Malpel S, **Merlin C**, François M-C and Jacquin-Joly E (2008) Molecular identification and characterization of two new Lepidoptera chemoreceptors belonging to the *Drosophila* OR83b family. *Insect Molecular Biology* 17: 587-596.
7. **Merlin C**, Lucas P, Rochat D, François M-C, Maïbèche-Coisne M and Jacquin-Joly E (2007) An antennal circadian clock and circadian rhythms in the peripheral pheromone reception in the moth *Spodoptera littoralis*. *Journal of Biological Rhythms* 22: 502-514.
6. **Merlin C**, Rosell G, Carot-Sans G, François M-C, Bozzolan F, Pelletier J, Jacquin-Joly E, Guerrero A and Maïbèche-Coisne M (2007) Antennal esterase cDNAs from two pest moths, *Spodoptera littoralis* and *Sesamia nonagrioides*, potentially involved in odourant degradation. *Insect Molecular Biology* 16: 73-81.
5. De Santis F, François M-C, **Merlin C**, Pelletier J, Maïbèche-Coisne M, Conti E and Jacquin-Joly E (2006) Molecular cloning and *in situ* expression patterns of two new pheromone-binding proteins from the corn stemborer *Sesamia nonagrioides*. *Journal of Chemical Ecology* 32: 1703-1717.
4. **Merlin C**, François M-C, Queguiner I, Maïbèche-Coisne M and Jacquin-Joly E (2006) Evidence for a putative antennal clock in *Mamestra brassicae*: molecular cloning and characterization of two clock genes-*period* and *cryptochrome*- in antennae. *Insect Molecular Biology* 15: 137-145.
3. **Merlin C**, François M-C, Bozzolan F, Pelletier J, Jacquin-Joly E and Maïbèche-Coisne M (2005) A new aldehyde oxidase selectively expressed in chemosensory organs of insects. *Biochemical and Biophysical Research Communications* 332: 4-10.
2. Maïbèche-Coisne M, **Merlin C**, François M-C, Porcheron P and Jacquin-Joly E (2005) P450 and P450 reductase cDNAs from the moth *Mamestra brassicae*: cloning and expression patterns in male antennae. *Gene* 346: 195-203.
1. Maïbèche-Coisne M, **Merlin C**, François M-C, Queguiner I, Porcheron P and Jacquin-Joly E (2004) Putative odorant-degrading esterase cDNA from the moth *Mamestra brassicae*: cloning and expression patterns in male and female antennae. *Chemical Senses* 29: 381-390.

**Reviews, book chapters**

8. **Merlin C** and Liedvogel M (2019) The genetics and epigenetics of animal migration and orientation: birds, butterflies, and beyond. *Journal of Experimental Biology*, *In press*.

7. Denlinger DL, Hahn DA, **Merlin C**, Holzapfel CM, and Bradshaw WE (2017) Keeping time without a spine: what can the insect clock teach us about seasonal adaptation? *Philosophical Transactions of the Royal Society B* 372:1734.
6. Reppert SM, Guerra PA and **Merlin C** (2016) Neurobiology of Monarch Butterfly Migration. *Annual Reviews of Entomology* 61:25-42.
5. **Merlin C**, Heinze S and Reppert SM (2012) Unraveling navigational strategies in migratory insects. *Current Opinion in Neurobiology* 22:353-61.
4. **Merlin C**, Gegeer RJ and Reppert SM (2011) Monarch butterfly migration. In, McGraw-Hill Yearbook of Science and Technology, pp 212-214.
3. Reppert SM, Gegeer RJ and **Merlin C** (2010) Navigational mechanisms of migrating monarch butterflies. *Trends in Neurosciences* 33: 399-406.
2. **Merlin C** and Reppert SM (2009) Lepidopteran circadian clocks: from molecules to behavior. In, Molecular Biology and Genetics of the Lepidoptera, Goldsmith M.R. and Marec, F.(Eds), Taylor & Francis, Boca Raton, FL, chap. 8, pp 137-152.
1. Jacquin-Joly E and **Merlin C** (2004) Insect olfactory receptors: contributions of molecular biology to chemical ecology. *Journal of Chemical Ecology* 30: 2359-97.

## Teaching

### BIOL 609: Molecular Tools

Graduate course that focuses on modern tools and methods used in prokaryotic and eukaryotic molecular biology. Students learn to choose the appropriate experimental technique for a given scientific question and to design and interpret experiments. (Co-Instructor with Dr. Menet Jerome, Fall semester; 50% effort)

### BIOL 214: Genes, Ecology and Evolution

Undergraduate sophomore-level course that provides a genetically-based introduction to the study of ecology and evolution with an emphasis on the interactions of organisms with each other and with their environment. (Spring semester; 100% effort)

## Research Personnel

### Current

Catherine Bogdan	Undergraduate research assistant <i>Recipient of: President's Endowed Scholarship, Billy G. Bethea '52 Scholarship, Joe and Billy Manion Endowed Scholarship, PACE Scholarship</i>
Alyssa Bennett	Undergraduate research assistant
Ashley Hayden	Undergraduate research assistant <i>Recipient of: 2018-2019 Astronaut Scholarship</i>
Samantha Iiams	Ph. D candidate <i>Recipient of: 2016 Texas A&amp;M Genetics Outstanding Performance in Teaching Award, Best poster prize in the junior category at the 2017 Texas A&amp;M Biology Student Postdoc Research Conference, Second place oral competition and People's Choice awards at the 2018 Texas A&amp;M Genetics Symposium, Poster prize at the 2018 Texas Society for Circadian Biology and Medicine meeting, 2018 Society for Research on Biological Rhythms Patricia DeCoursey Excellence Award, 2018 Texas A&amp;M Genetics Program Travel Award</i>
Alec Judd	Technician
Aldrin Lugena	Ph. D candidate <i>Recipient of: 2018 Society for Research on Biological Rhythms Trainee Research Merit Award, 2018 Texas A&amp;M Department of Biology Travel Award</i>
Anna Subonj	Undergraduate research assistant
Dr. Guijun Wan	Postdoctoral Researcher
Dr. Ying Zhang	Research Associate

### Previous Visiting Scholars

Dr. Alok Arun	Assistant Professor, Institute of Sustainable Biotechnology, Inter American University of Puerto Rico
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The objective of this grant is to establish an automated telemetry system in British Columbia to quantify migratory timing, orientation and gene expression in Swainson's thrushes hybrids.

### Completed

Center for Biological Clocks Research Bridge Funds Mini Grant (Co-PI with Dr. Paul Hardin) 2014  
Title: Knocking out and tagging clock genes in *Drosophila* and the Monarch butterfly using CRISPR/Cas9 and TALEN-mediated genome editing approaches  
Total amount: \$16,000

## **University Services**

### Departmental

2015-2017 Faculty Search Committee, Department of Biology, Member (two consecutive searches)  
2015 Student/Postdoc Research Conference Committee, Department of Biology, Chair  
2014, 2016 Student/Postdoc Research Conference Committee, Department of Biology, Member

### Graduate Committee member

2018- Kushal Bakshi, Neuroscience Program  
2018- Whitney Robertson, Department of Biology  
2018- James Kutlowski, Department of Biology  
2018- Jordan Holland, Genetics Program  
2017- Guosong Wang, Department of Animal Science  
2017- Amy Tan, Department of Biology  
2016- Justin Overcash, Genetics Program  
2016- Ashley Tessnow, Department of Entomology  
2015- Zachary Popkin-Hall, Department of Entomology 2015- Joshua Beytebiere, Department  
of Biology  
2014- Michael Werry, Department of Biology  
2015-2018 Andrew Sakla, Department of Biology  
2016-2018 Miguel Gonzales, Genetics Program  
2016-2018 Melanie DeSessa, Chemical Engineering Department  
2015-2017 Courtney Caster, Genetics Program  
2014-2017 Tianxin Liu, Department of Biology

### Interdepartmental

2016- Texas A&M Genetics Graduate program, Graduate Recruiting Committee, Member  
2015-2016 Texas A&M Genetics Graduate program, Graduate Advising Committee, Member  
2014-2016 Texas A&M Institute for Neuroscience, Graduate Program Committee, Member